



1
00:00:11,930 --> 00:00:03,379
with Garrett Modell on the far right

2
00:00:15,350 --> 00:00:11,940
Bernie hi and Who am I ken r allen and

3
00:00:17,029 --> 00:00:15,360
and my end I'm Daniel Sheehan the the

4
00:00:17,840 --> 00:00:17,039
format of this is completely flexible we

5
00:00:20,000 --> 00:00:17,850
hope to have lots of audience

6
00:00:22,640 --> 00:00:20,010
participation but what we'd like to talk

7
00:00:24,560 --> 00:00:22,650
about I think our our our visions of

8
00:00:26,929 --> 00:00:24,570
where where the future of energy is and

9
00:00:28,550 --> 00:00:26,939
whether it's going to be the status quo

10
00:00:31,669 --> 00:00:28,560
or whether they're going to be major

11
00:00:34,010 --> 00:00:31,679
changes and how we look at energy and

12
00:00:35,380 --> 00:00:34,020
obviously from the point of view of SSC

13
00:00:37,970 --> 00:00:35,390

we're looking for breakthroughs I think

14

00:00:39,410 --> 00:00:37,980

once represented here I think would be a

15

00:00:43,040 --> 00:00:39,420

vacuum energy and second law primarily

16

00:00:45,290 --> 00:00:43,050

but there are other ones as well for

17

00:00:46,459 --> 00:00:45,300

instance low energy nuclear reactions i

18

00:00:48,950 --> 00:00:46,469

think Garrett's a little bit involved in

19

00:00:51,830 --> 00:00:48,960

that as well or just starting to but

20

00:00:53,779 --> 00:00:51,840

there are a number of them and i think

21

00:00:59,240 --> 00:00:53,789

all of us can see some of the fruits of

22

00:01:01,270 --> 00:00:59,250

the the current energy dilemma where the

23

00:01:03,380 --> 00:01:01,280

price of oil can can fluctuate between

24

00:01:06,560 --> 00:01:03,390

forty dollars a barrel one hundred fifty

25

00:01:09,310 --> 00:01:06,570

dollars a barrel leading to not just

26
00:01:11,990 --> 00:01:09,320
energy shortages but food shortages as

27
00:01:14,630 --> 00:01:12,000
the united states plows more of its a

28
00:01:16,940 --> 00:01:14,640
corn and makes it into biofuels and

29
00:01:19,580 --> 00:01:16,950
makes makes corn and expensive commodity

30
00:01:20,780 --> 00:01:19,590
on the world market or the disaster in

31
00:01:22,429 --> 00:01:20,790
the gulf that we're seeing unfold and

32
00:01:26,719 --> 00:01:22,439
may not be solved for many months or

33
00:01:28,340 --> 00:01:26,729
years ahead we pay the price energy is

34
00:01:30,679 --> 00:01:28,350
lifblood of civilization without it you

35
00:01:31,910 --> 00:01:30,689
cannot have civilization but at the same

36
00:01:33,950 --> 00:01:31,920
time there are many drawbacks which

37
00:01:36,609 --> 00:01:33,960
we're seeing in terms of things like as

38
00:01:39,050 --> 00:01:36,619

broad as climate change global warming

39

00:01:41,270 --> 00:01:39,060

the rise in co2 levels in the atmosphere

40

00:01:43,969 --> 00:01:41,280

the acidification of the oceans many

41

00:01:47,030 --> 00:01:43,979

things so if we can find alternatives

42

00:01:49,249 --> 00:01:47,040

which are clean green plentiful high

43

00:01:51,590 --> 00:01:49,259

power densities and so on we this

44

00:01:53,450 --> 00:01:51,600

society may be one of the one of the

45

00:01:55,190 --> 00:01:53,460

Keystone's one of the linchpins in a

46

00:01:57,440 --> 00:01:55,200

revolution which which is not just an

47

00:02:01,010 --> 00:01:57,450

energy but in societal transformation in

48

00:02:02,420 --> 00:02:01,020

the way we steward our planet so this

49

00:02:03,980 --> 00:02:02,430

will be a wide-ranging discussion and

50

00:02:05,569 --> 00:02:03,990

again we we would like to see as much

51
00:02:07,130 --> 00:02:05,579
audience participation as possible

52
00:02:08,760 --> 00:02:07,140
because we don't know very much up here

53
00:02:10,830 --> 00:02:08,770
I don't think

54
00:02:23,820 --> 00:02:10,840
I think it wants to start off with a few

55
00:02:33,120 --> 00:02:23,830
slides sorry really i thought you were

56
00:02:43,380 --> 00:02:38,160
ah there you are hello Thank You Daniel

57
00:02:45,000 --> 00:02:43,390
so what I want to do here is just in as

58
00:02:47,880 --> 00:02:45,010
Daniel suggested sort of stimulate

59
00:02:51,330 --> 00:02:47,890
discussion with talking about some of

60
00:02:53,670 --> 00:02:51,340
the basic energy principles that were

61
00:02:57,600 --> 00:02:53,680
that we're dealing with in trying to

62
00:02:59,160 --> 00:02:57,610
look for new energy and I'll go through

63
00:03:02,760 --> 00:02:59,170

these slides fairly quickly and just

64

00:03:05,100 --> 00:03:02,770

described my view on it we may or may

65

00:03:06,840 --> 00:03:05,110

not take you use these as a take-off for

66

00:03:09,840 --> 00:03:06,850

discussion depending on what other

67

00:03:12,630 --> 00:03:09,850

people have to say just in response to

68

00:03:14,670 --> 00:03:12,640

Kim and Daniel's quotes about zero point

69

00:03:17,760 --> 00:03:14,680

energy I just while they were talking I

70

00:03:20,160 --> 00:03:17,770

pulled this one up which is Albert

71

00:03:21,810 --> 00:03:20,170

Einstein's and he said classical

72

00:03:24,690 --> 00:03:21,820

thermodynamics is the only physical

73

00:03:26,580 --> 00:03:24,700

theory of universal content which I am

74

00:03:28,470 --> 00:03:26,590

convinced will never be overthrown um

75

00:03:29,550 --> 00:03:28,480

that's a nice one I actually put that

76

00:03:31,850 --> 00:03:29,560

have that at the end of one of my

77

00:03:35,460 --> 00:03:31,860

articles and if you look at what it says

78

00:03:37,470 --> 00:03:35,470

it's tautological it says classical

79

00:03:40,710 --> 00:03:37,480

thermodynamics will never be overthrown

80

00:03:42,510 --> 00:03:40,720

where it applies which means that it

81

00:03:45,000 --> 00:03:42,520

will never be overthrown where it is

82

00:03:50,640 --> 00:03:45,010

valid well that's fine but it will be

83

00:03:54,870 --> 00:03:50,650

overthrown where it is not valid I won't

84

00:03:56,250 --> 00:03:54,880

I'll leave it leave it as it is so I

85

00:03:59,700 --> 00:03:56,260

we've all talked a little bit about

86

00:04:01,590 --> 00:03:59,710

Maxwell's demon and I don't III agree

87

00:04:03,840 --> 00:04:01,600

with you know what everybody has said

88

00:04:05,160 --> 00:04:03,850

about it what I want to do is just talk

89

00:04:07,890 --> 00:04:05,170

a little bit about the second law of

90

00:04:09,810 --> 00:04:07,900

thermodynamics from just yet another

91

00:04:15,480 --> 00:04:09,820

perspective because it's such a profound

92

00:04:17,400 --> 00:04:15,490

profound law and that is that originally

93

00:04:20,699 --> 00:04:17,410

it was developed in its various forms

94

00:04:23,400 --> 00:04:20,709

and I think you quoted eighteen

95

00:04:26,310 --> 00:04:23,410

different variations of it was out

96

00:04:30,210 --> 00:04:26,320

correct to learn something like that it

97

00:04:33,840 --> 00:04:30,220

originally evolved from an experimental

98

00:04:37,770 --> 00:04:33,850

view of burning what happens if you

99

00:04:40,190 --> 00:04:37,780

convert heat into work and what the

100

00:04:43,600 --> 00:04:40,200

limits are then later it was

101
00:04:47,800 --> 00:04:43,610
reconstituted in its statistical form

102
00:04:50,379 --> 00:04:47,810
and it's statistical form simply says

103
00:04:52,659 --> 00:04:50,389
that you've got a couple of basic

104
00:04:55,809 --> 00:04:52,669
assumptions one is let's say that we've

105
00:04:59,700 --> 00:04:55,819
got a system of ideal gas in a chamber

106
00:05:05,230 --> 00:04:59,710
and so if we assume that that ideal gas

107
00:05:07,270 --> 00:05:05,240
is in a number accountable number of

108
00:05:08,740 --> 00:05:07,280
different configurations in other words

109
00:05:11,679 --> 00:05:08,750
we can either have this particle over

110
00:05:14,379 --> 00:05:11,689
here or over there or over there and the

111
00:05:17,499 --> 00:05:14,389
number of different states of that

112
00:05:22,240 --> 00:05:17,509
system can be somehow enumerated and

113
00:05:23,980 --> 00:05:22,250

it's a huge huge number that's one basic

114

00:05:26,950 --> 00:05:23,990

assumption and the other basic

115

00:05:30,129 --> 00:05:26,960

assumption is that these states are all

116

00:05:33,909 --> 00:05:30,139

equally likely so if you take those two

117

00:05:37,839 --> 00:05:33,919

ideas then you say okay let's put all of

118

00:05:41,019 --> 00:05:37,849

the gas into one half of the chamber and

119

00:05:43,179 --> 00:05:41,029

let time pass well the gas is going to

120

00:05:48,010 --> 00:05:43,189

redistribute itself over the entire

121

00:05:50,999 --> 00:05:48,020

chamber and it will get into a state in

122

00:05:54,519 --> 00:05:51,009

which it's got the most possible

123

00:05:56,740 --> 00:05:54,529

configurations so it's it will get into

124

00:06:00,040 --> 00:05:56,750

a state where it's spread out because

125

00:06:02,050 --> 00:06:00,050

that's the most possible ways that you

126

00:06:03,700 --> 00:06:02,060

can distribute the gas end up with their

127

00:06:05,200 --> 00:06:03,710

weather being in a state where its most

128

00:06:07,959 --> 00:06:05,210

spread out I didn't say that very well

129

00:06:12,360 --> 00:06:07,969

that I think you got the basic idea so

130

00:06:16,059 --> 00:06:12,370

uh and from that we can say what

131

00:06:20,820 --> 00:06:16,069

equilibrium is that equilibrium occurs

132

00:06:25,409 --> 00:06:20,830

when the gas or electrons or heat or

133

00:06:27,939 --> 00:06:25,419

particles or thoughts are in the most

134

00:06:32,709 --> 00:06:27,949

spread out state in the state of

135

00:06:35,260 --> 00:06:32,719

greatest multiplicity and so then we

136

00:06:38,439 --> 00:06:35,270

have good old Maxwell's demon who tries

137

00:06:41,409 --> 00:06:38,449

to disobey it and as Daniel Sheehan said

138

00:06:43,659 --> 00:06:41,419

ultimately the reason that Maxwell's

139

00:06:46,209 --> 00:06:43,669

demon cannot work in this type of a

140

00:06:48,909 --> 00:06:46,219

configuration has to do with information

141

00:06:51,070 --> 00:06:48,919

because he has to eject information when

142

00:06:52,990 --> 00:06:51,080

he forgets one configuration of the

143

00:06:54,760 --> 00:06:53,000

system to move to the next configuration

144

00:06:55,879 --> 00:06:54,770

and at this point it's pretty well

145

00:06:57,709 --> 00:06:55,889

established

146

00:07:01,339 --> 00:06:57,719

information entropy and thermodynamic

147

00:07:03,200 --> 00:07:01,349

entropy are the same thing so the second

148

00:07:05,390 --> 00:07:03,210

law of thermodynamics has been around I

149

00:07:06,980 --> 00:07:05,400

as I mentioned a little bit earlier and

150

00:07:09,050 --> 00:07:06,990

probably going to be end up being the

151
00:07:11,239 --> 00:07:09,060
conservative person on this panel just

152
00:07:17,029 --> 00:07:11,249
in that from my perspective I haven't

153
00:07:19,059 --> 00:07:17,039
seen deviations from it so we there are

154
00:07:21,860 --> 00:07:19,069
a number of different types of

155
00:07:25,369 --> 00:07:21,870
situations where we'd like to extract

156
00:07:27,439 --> 00:07:25,379
energy from a uniform distribution but

157
00:07:28,670 --> 00:07:27,449
we can't extract it from a uniform

158
00:07:30,469 --> 00:07:28,680
distribution unless there is a

159
00:07:33,080 --> 00:07:30,479
difference there needs to be some

160
00:07:35,600 --> 00:07:33,090
difference to drive it so imagine the

161
00:07:40,010 --> 00:07:35,610
ocean being totally flat and we want the

162
00:07:45,170 --> 00:07:40,020
flowing of water to then give us some

163
00:07:47,089 --> 00:07:45,180

sort of a harvestable energy and this is

164

00:07:49,010 --> 00:07:47,099

not exactly the second law of

165

00:07:50,800 --> 00:07:49,020

thermodynamics but it's pretty close to

166

00:07:52,939 --> 00:07:50,810

it saying that when you've got

167

00:07:56,329 --> 00:07:52,949

equilibrium when you've got a uniform

168

00:07:58,309 --> 00:07:56,339

distribution it's impossible to get work

169

00:08:00,950 --> 00:07:58,319

out of it now there are several

170

00:08:04,969 --> 00:08:00,960

ingenious schemes Daniels and Ken's

171

00:08:07,159 --> 00:08:04,979

which attempt to do so and I imagine it

172

00:08:09,469 --> 00:08:07,169

if they want they'll explain why this

173

00:08:13,399 --> 00:08:09,479

particular scheme doesn't apply in their

174

00:08:14,869 --> 00:08:13,409

situation i am bernie will talk about

175

00:08:17,300 --> 00:08:14,879

another one where we say this doesn't

176

00:08:19,700 --> 00:08:17,310

apply and that has to do with the

177

00:08:22,610 --> 00:08:19,710

zero-point energy because with zero

178

00:08:24,860 --> 00:08:22,620

point energy there is a situation in

179

00:08:26,990 --> 00:08:24,870

which the sea level is not flat and

180

00:08:29,570 --> 00:08:27,000

that's when you've got a Casimir cavity

181

00:08:32,719 --> 00:08:29,580

so when you at the mouth of the Casimir

182

00:08:35,630 --> 00:08:32,729

cavity inside the Casimir cavity there

183

00:08:37,939 --> 00:08:35,640

is a lower energy level than there is

184

00:08:39,769 --> 00:08:37,949

outside and you just can stand there for

185

00:08:41,800 --> 00:08:39,779

as long as you like and you will end up

186

00:08:45,410 --> 00:08:41,810

with this difference it's it's like

187

00:08:47,840 --> 00:08:45,420

Moses walking through the Red Sea and

188

00:08:49,910 --> 00:08:47,850

they're genuinely is this difference in

189

00:08:53,139 --> 00:08:49,920

the sea level so for that reason Bernie

190

00:08:56,210 --> 00:08:53,149

and I believe there's a possibility of

191

00:08:59,360 --> 00:08:56,220

harvesting a zero-point energy by making

192

00:09:03,170 --> 00:08:59,370

use of this difference as a driving

193

00:09:04,550 --> 00:09:03,180

force for in casimir cavities and again

194

00:09:08,010 --> 00:09:04,560

I'm not going to go into great detail

195

00:09:10,210 --> 00:09:08,020

here so

196

00:09:12,100 --> 00:09:10,220

something that's troubled me from the

197

00:09:13,600 --> 00:09:12,110

very beginning as I've been working with

198

00:09:16,540 --> 00:09:13,610

new energies and this has been for a

199

00:09:20,830 --> 00:09:16,550

number of years now is if there is an

200

00:09:22,690 --> 00:09:20,840

energy source presumably Nature has made

201
00:09:26,440 --> 00:09:22,700
use of it because nature is extremely

202
00:09:29,560 --> 00:09:26,450
ingenious either physical nature or a

203
00:09:31,690 --> 00:09:29,570
living nature and so let's look at some

204
00:09:34,540 --> 00:09:31,700
different forms of energy and see

205
00:09:37,950 --> 00:09:34,550
whether nature has made use of them so

206
00:09:40,420 --> 00:09:37,960
one for example and the mechanical

207
00:09:43,270 --> 00:09:40,430
gravitational energy well certainly

208
00:09:44,830 --> 00:09:43,280
Nature has made use of mechanical and

209
00:09:49,690 --> 00:09:44,840
gravitational energy and we see that all

210
00:09:52,300 --> 00:09:49,700
over the place second one what about

211
00:09:54,220 --> 00:09:52,310
chemical energy when we burn something

212
00:09:56,260 --> 00:09:54,230
or we have a chemical reaction well

213
00:10:00,360 --> 00:09:56,270

clearly we see that all over the place

214

00:10:02,710 --> 00:10:00,370

in nature and that that's that's a fine

215

00:10:05,890 --> 00:10:02,720

form for energy and so I've got

216

00:10:09,070 --> 00:10:05,900

confidence that we can use that what

217

00:10:11,200 --> 00:10:09,080

about the conversion of light into a

218

00:10:12,940 --> 00:10:11,210

usable form of energy let's say I never

219

00:10:15,190 --> 00:10:12,950

have seen a solar cell and I'm wondering

220

00:10:18,100 --> 00:10:15,200

is it possible to build a solar cell

221

00:10:20,680 --> 00:10:18,110

well on nature uses photosynthesis all

222

00:10:24,220 --> 00:10:20,690

the time and so that seems to me to be a

223

00:10:27,220 --> 00:10:24,230

pretty feasible one and i can see nature

224

00:10:29,170 --> 00:10:27,230

does it so what about electromagnetic

225

00:10:32,200 --> 00:10:29,180

let's say i want to build a motor in

226

00:10:37,030 --> 00:10:32,210

which i convert electricity into into

227

00:10:40,870 --> 00:10:37,040

work or electric potential into into

228

00:10:43,780 --> 00:10:40,880

work well certainly I see the effects of

229

00:10:46,480 --> 00:10:43,790

electromagnetics within nature not only

230

00:10:48,670 --> 00:10:46,490

enlightening but actually as many of us

231

00:10:51,610 --> 00:10:48,680

now know the electric universe is

232

00:10:54,760 --> 00:10:51,620

becoming something of a hot topic and

233

00:10:56,680 --> 00:10:54,770

that electricity drives not only things

234

00:11:03,540 --> 00:10:56,690

here on earth but it may very well drive

235

00:11:06,370 --> 00:11:03,550

cosmology what about a thermal or wind

236

00:11:08,950 --> 00:11:06,380

vibrational variations or wind if I want

237

00:11:11,190 --> 00:11:08,960

to build a windmill can I do it well we

238

00:11:14,920 --> 00:11:11,200

know that nature does make use of wind I

239

00:11:21,620 --> 00:11:20,420

so what else what about nuclear well you

240

00:11:23,600 --> 00:11:21,630

know we've got evidence that

241

00:11:26,090 --> 00:11:23,610

thermonuclear reactions are occurring in

242

00:11:28,780 --> 00:11:26,100

the Sun and in stars and so that seems

243

00:11:31,630 --> 00:11:28,790

like a reasonable thing for us to use

244

00:11:35,000 --> 00:11:31,640

well what about zero point energy and

245

00:11:38,030 --> 00:11:35,010

here I'm troubled and I put a big

246

00:11:40,520 --> 00:11:38,040

question mark up there may be zero point

247

00:11:42,950 --> 00:11:40,530

energy is being used as a source of

248

00:11:45,380 --> 00:11:42,960

energy within stars we don't really know

249

00:11:51,920 --> 00:11:45,390

we don't have evidence that it's not am

250

00:11:55,550 --> 00:11:51,930

I right Bernie so but the but we don't

251

00:11:57,680 --> 00:11:55,560

have evidence but it really is a point

252

00:11:59,630 --> 00:11:57,690

energy source so I don't know and that

253

00:12:01,820 --> 00:11:59,640

troubles me given that you know my lab

254

00:12:03,770 --> 00:12:01,830

has done a fair bit of work looking to

255

00:12:06,260 --> 00:12:03,780

harvest zero-point energy well and

256

00:12:08,200 --> 00:12:06,270

Garrett I mean zero point energy I mean

257

00:12:10,430 --> 00:12:08,210

with the zero-point feels important in

258

00:12:12,740 --> 00:12:10,440

dozens of different physical phenomena I

259

00:12:15,230 --> 00:12:12,750

mean certainly it's invoked from van der

260

00:12:17,150 --> 00:12:15,240

Waals forces and and spontaneous or

261

00:12:18,890 --> 00:12:17,160

maybe no question there are lots of

262

00:12:21,230 --> 00:12:18,900

physical manifestations of zero point

263

00:12:23,090 --> 00:12:21,240

energy so to say that it's that because

264

00:12:25,430 --> 00:12:23,100

an organism doesn't necessarily exploit

265

00:12:26,990 --> 00:12:25,440

it I mean it certainly is it's it's it's

266

00:12:28,400 --> 00:12:27,000

fundamental I me if you ask Dan Cole he

267

00:12:30,020 --> 00:12:28,410

says almost every process in nature

268

00:12:32,000 --> 00:12:30,030

depends on zero point energy when we

269

00:12:33,140 --> 00:12:32,010

were absolutely I agree I agree a

270

00:12:36,440 --> 00:12:33,150

hundred percent with everything you've

271

00:12:40,390 --> 00:12:36,450

said except the one part about

272

00:12:43,550 --> 00:12:40,400

exploiting because Nature doesn't you

273

00:12:46,880 --> 00:12:43,560

when we don't recognize it yet but it

274

00:12:48,920 --> 00:12:46,890

may be there well actually I that may be

275

00:12:50,330 --> 00:12:48,930

true because when Bernie Bernie first

276

00:12:53,990 --> 00:12:50,340

approached me with a zero point energy

277

00:12:57,860 --> 00:12:54,000

idea I spent a lot of time fighting

278

00:12:59,840 --> 00:12:57,870

Bernie and I did some calculations to

279

00:13:01,700 --> 00:12:59,850

see what the pumping energy would be and

280

00:13:04,550 --> 00:13:01,710

turned out the pumping energy for Bernie

281

00:13:06,200 --> 00:13:04,560

scheme was fine then I did a number of

282

00:13:09,020 --> 00:13:06,210

things and in every case it came out

283

00:13:10,970 --> 00:13:09,030

okay another thing I did is I was

284

00:13:14,060 --> 00:13:10,980

thinking what we're in nature does the

285

00:13:16,340 --> 00:13:14,070

zero-point energy used and the one place

286

00:13:19,810 --> 00:13:16,350

that intrigues me and it still kind of

287

00:13:24,920 --> 00:13:19,820

intrigues me is fungus and mushrooms

288

00:13:26,210 --> 00:13:24,930

because we know that fungus are the

289

00:13:27,740 --> 00:13:26,220

biggest life-forms on Earth either

290

00:13:29,270 --> 00:13:27,750

fungus or aspen trees I'm not

291

00:13:32,540 --> 00:13:29,280

which but they're there they're

292

00:13:36,050 --> 00:13:32,550

absolutely huge you know their many the

293

00:13:38,180 --> 00:13:36,060

size of this hotel and we the

294

00:13:41,720 --> 00:13:38,190

conventional wisdom is that fungus uses

295

00:13:43,640 --> 00:13:41,730

a decaying organic matter as its energy

296

00:13:45,680 --> 00:13:43,650

source on the other hand fungus has

297

00:13:49,400 --> 00:13:45,690

these little tubes in it that sure are

298

00:13:51,170 --> 00:13:49,410

like casimir cavities and it just sort

299

00:13:53,750 --> 00:13:51,180

of makes me wonder it would be a lot of

300

00:13:57,440 --> 00:13:53,760

fun to try to do an experiment and see

301
00:14:00,740 --> 00:13:57,450
does fungus somehow produce more energy

302
00:14:04,040 --> 00:14:00,750
than it appears to consume but you know

303
00:14:05,240 --> 00:14:04,050
I'm still looking so I can I I agree

304
00:14:07,940 --> 00:14:05,250
with you you know they're there may be

305
00:14:10,880 --> 00:14:07,950
forms we haven't found but it troubles

306
00:14:13,370 --> 00:14:10,890
me that we haven't found them and then

307
00:14:15,140 --> 00:14:13,380
this if we look at other sort of

308
00:14:19,430 --> 00:14:15,150
potential steps and I use this potential

309
00:14:21,890 --> 00:14:19,440
step simply because of Daniels scheme

310
00:14:25,130 --> 00:14:21,900
which which involves a semiconductor

311
00:14:27,950 --> 00:14:25,140
Junction and have we seen nature make

312
00:14:30,620 --> 00:14:27,960
use of these things well we haven't and

313
00:14:32,690 --> 00:14:30,630

does that mean we can't do it no because

314

00:14:35,180 --> 00:14:32,700

we certainly go many places that nature

315

00:14:36,920 --> 00:14:35,190

hasn't gone on the other hand it

316

00:14:41,510 --> 00:14:36,930

troubles me a little bit so I leave it

317

00:14:43,010 --> 00:14:41,520

at that well I'd like to make an

318

00:14:44,480 --> 00:14:43,020

immediate response to the to the last

319

00:14:46,700 --> 00:14:44,490

argument which is that because nature

320

00:14:49,520 --> 00:14:46,710

hasn't exploited it yet that somehow

321

00:14:51,170 --> 00:14:49,530

that we will not be able to either I

322

00:14:54,200 --> 00:14:51,180

mean you don't look around you don't

323

00:14:56,660 --> 00:14:54,210

walk through Antarctica or I'll say the

324

00:14:58,700 --> 00:14:56,670

deep dark of Africa places people

325

00:15:00,140 --> 00:14:58,710

haven't been and find internal

326

00:15:02,240 --> 00:15:00,150

combustion engines sitting on the ground

327

00:15:05,060 --> 00:15:02,250

they don't spontaneously rise in or do

328

00:15:07,670 --> 00:15:05,070

747s we've been able to achieve

329

00:15:09,950 --> 00:15:07,680

temperatures down near you know 10 or

330

00:15:11,150 --> 00:15:09,960

100 nano Kelvin and nature only produces

331

00:15:13,310 --> 00:15:11,160

temperatures down to three kelp and

332

00:15:14,900 --> 00:15:13,320

we've gone a temperature difference of a

333

00:15:17,120 --> 00:15:14,910

factor of a million or a billion below

334

00:15:18,170 --> 00:15:17,130

what nature can achieve we have

335

00:15:21,590 --> 00:15:18,180

computers which don't spontaneously

336

00:15:23,150 --> 00:15:21,600

arise so the fat and if you have if you

337

00:15:24,410 --> 00:15:23,160

have a gallon of gasoline sitting on on

338

00:15:25,790 --> 00:15:24,420

in the middle of a field it's never

339

00:15:27,920 --> 00:15:25,800

going to do anything without building an

340

00:15:29,180 --> 00:15:27,930

internal combustion engine to make use

341

00:15:31,220 --> 00:15:29,190

of it it's not going to do any really

342

00:15:35,460 --> 00:15:31,230

useful work for you it'll just simply

343

00:15:37,140 --> 00:15:35,470

degrade over time um nature

344

00:15:40,590 --> 00:15:37,150

should have built an internal combustion

345

00:15:43,230 --> 00:15:40,600

engine and I misspoke what I meant to

346

00:15:47,570 --> 00:15:43,240

say I thought I said it was it hasn't

347

00:15:49,770 --> 00:15:47,580

used a particular type of reaction right

348

00:15:51,030 --> 00:15:49,780

right well as well the second law is a

349

00:15:52,620 --> 00:15:51,040

subtle thing I mean I certainly would

350

00:15:54,600 --> 00:15:52,630

say that it hasn't there's no obvious

351
00:15:56,550 --> 00:15:54,610
violation of it up to now but that

352
00:15:58,230 --> 00:15:56,560
doesn't mean that a violation cannot be

353
00:16:01,830 --> 00:15:58,240
achieved through through clever

354
00:16:05,460 --> 00:16:01,840
construction now there are man-made

355
00:16:08,250 --> 00:16:05,470
things that do not exist in nature we

356
00:16:10,560 --> 00:16:08,260
know that tornadoes and storms and other

357
00:16:13,050 --> 00:16:10,570
things like that are heat engines but

358
00:16:14,940 --> 00:16:13,060
they're open cycle we have closed cycle

359
00:16:16,950 --> 00:16:14,950
heat engines by the millions if not

360
00:16:20,550 --> 00:16:16,960
billions on this planet and I have yet

361
00:16:30,960 --> 00:16:20,560
to see one in nature again I think

362
00:16:33,150 --> 00:16:30,970
you're taking okay okay sure okay I'd

363
00:16:36,630 --> 00:16:33,160

like to address the first of Ken's

364

00:16:39,300 --> 00:16:36,640

statements which is that somehow the the

365

00:16:41,790 --> 00:16:39,310

conformance of ideal gases and in finite

366

00:16:46,320 --> 00:16:41,800

and finite containers to the second law

367

00:16:48,240 --> 00:16:46,330

somehow extends to two other kinds of

368

00:16:50,730 --> 00:16:48,250

devices i think i think i can show that

369

00:16:52,320 --> 00:16:50,740

it really doesn't and in fact the second

370

00:16:53,790 --> 00:16:52,330

law of devices least that our groups

371

00:16:57,240 --> 00:16:53,800

proposing San Diego has more in common

372

00:16:59,640 --> 00:16:57,250

with with with with the zero-point

373

00:17:00,780 --> 00:16:59,650

engine you're talking about a zero-point

374

00:17:03,390 --> 00:17:00,790

engine you're talking about that you

375

00:17:05,010 --> 00:17:03,400

might imagine so let me use a some low

376

00:17:18,290 --> 00:17:05,020

tech stuff and kind of try to explain

377

00:17:24,390 --> 00:17:21,360

okay from the audience how does how does

378

00:17:27,600 --> 00:17:24,400

a hydroelectric power plant work what is

379

00:17:30,120 --> 00:17:27,610

it what does it make use of makes use of

380

00:17:33,300 --> 00:17:30,130

gravity but it's not just gravitational

381

00:17:39,950 --> 00:17:33,310

potential it's a gravitational potential

382

00:17:45,390 --> 00:17:43,170

water water in the back and the water

383

00:17:46,740 --> 00:17:45,400

falls through the damn turns a turbine

384

00:17:49,350 --> 00:17:46,750

which turns a generator which makes

385

00:17:51,690 --> 00:17:49,360

electricity get that straight thank you

386

00:17:54,900 --> 00:17:51,700

so you have a gravitational potential

387

00:17:56,580 --> 00:17:54,910

difference between pens not working very

388

00:18:00,930 --> 00:17:56,590

well as anyone have a pen many chance

389

00:18:02,820 --> 00:18:00,940

fell pen no okay gravitational potential

390

00:18:06,420 --> 00:18:02,830

gradient how about when you drive

391

00:18:08,700 --> 00:18:06,430

electricity voltage does not does not

392

00:18:10,980 --> 00:18:08,710

accelerate charges it's a voltage

393

00:18:13,680 --> 00:18:10,990

gradient that accelerates charges

394

00:18:15,840 --> 00:18:13,690

electric field accelerate charges so

395

00:18:17,460 --> 00:18:15,850

it's the gradient in the potential that

396

00:18:19,550 --> 00:18:17,470

accelerates charges in any kind of

397

00:18:23,040 --> 00:18:19,560

electronic device that accelerates

398

00:18:26,730 --> 00:18:23,050

masses in a gravitational field it's the

399

00:18:28,170 --> 00:18:26,740

gradient that does that so in in the PN

400

00:18:36,060 --> 00:18:28,180

junctions that we're being discussed

401

00:18:39,320 --> 00:18:36,070

this afternoon I really need a does

402

00:18:45,270 --> 00:18:39,330

anyone have anything like a felt pen

403

00:18:48,560 --> 00:18:45,280

anything at all okay Oh a sharpie

404

00:18:54,499 --> 00:18:52,159

alright employment level okay so we have

405

00:18:56,779 --> 00:18:54,509

an N and P region here and as a result

406

00:18:58,789 --> 00:18:56,789

of electrons going this way and holes

407

00:19:02,269 --> 00:18:58,799

going the other way we end up with an

408

00:19:05,330 --> 00:19:02,279

electric field in the material but it's

409

00:19:06,769 --> 00:19:05,340

very small it's micron sized and but but

410

00:19:08,840 --> 00:19:06,779

it's that electric field that gets

411

00:19:11,149 --> 00:19:08,850

developed in this PN Junction which is

412

00:19:13,009 --> 00:19:11,159

ultimately exploited to create the

413

00:19:16,340 --> 00:19:13,019

energy to drive these oscillators that

414

00:19:19,070 --> 00:19:16,350

we my colleagues and I are working on so

415

00:19:21,169 --> 00:19:19,080

the same kinds of potentials different

416

00:19:22,190 --> 00:19:21,179

gradients that are used to drive regular

417

00:19:24,409 --> 00:19:22,200

electric circuits which you're familiar

418

00:19:27,350 --> 00:19:24,419

with are the same kinds of electric

419

00:19:30,230 --> 00:19:27,360

fields that we're exploiting at the

420

00:19:31,430 --> 00:19:30,240

microscopic level for our devices the

421

00:19:33,259 --> 00:19:31,440

difference is the reason why these

422

00:19:35,389 --> 00:19:33,269

haven't been looked at is because

423

00:19:36,889 --> 00:19:35,399

they're microscopic in back 150 years

424

00:19:38,720 --> 00:19:36,899

ago there's no one who could who could

425

00:19:41,659 --> 00:19:38,730

imagine or even think of something like

426

00:19:43,039 --> 00:19:41,669

a PN diode it wasn't available but it is

427

00:19:44,810 --> 00:19:43,049

the gradient in the in the potential

428

00:19:46,909 --> 00:19:44,820

that's important and this is an

429

00:19:48,649 --> 00:19:46,919

equilibrium system this is thermal

430

00:19:51,950 --> 00:19:48,659

equilibrium thermal equilibrium does

431

00:19:54,499 --> 00:19:51,960

create and does have macroscopic

432

00:19:56,810 --> 00:19:54,509

potential gradients which can be

433

00:19:58,610 --> 00:19:56,820

exploited in the same fashion that the

434

00:20:01,549 --> 00:19:58,620

non-equilibrium ones which are created

435

00:20:04,519 --> 00:20:01,559

through electric generators or electric

436

00:20:06,649 --> 00:20:04,529

or chemical motors or whatever else also

437

00:20:08,180 --> 00:20:06,659

create so what we're doing is not that

438

00:20:09,860 --> 00:20:08,190

much different in a sense even from what

439

00:20:12,889 --> 00:20:09,870

you're doing you're you are creating

440

00:20:14,869 --> 00:20:12,899

boundary conditions with in order to

441

00:20:17,180 --> 00:20:14,879

create cavities which have differential

442

00:20:19,509 --> 00:20:17,190

amounts of zero point in them we're

443

00:20:22,700 --> 00:20:19,519

creating special geometries which create

444

00:20:24,440 --> 00:20:22,710

gradients and differences in electric

445

00:20:26,180 --> 00:20:24,450

fields which allow us to do work to

446

00:20:27,950 --> 00:20:26,190

ultimately if you want to do work you

447

00:20:31,060 --> 00:20:27,960

need you need to have things like

448

00:20:33,289 --> 00:20:31,070

potential gradients and particle fluxes

449

00:20:35,600 --> 00:20:33,299

equilibrium systems allow for this so

450

00:20:37,789 --> 00:20:35,610

and this is not an ideal gas but it is

451

00:20:40,129 --> 00:20:37,799

an equilibrium system so the various

452

00:20:42,409 --> 00:20:40,139

systems i've looked at plasma systems on

453

00:20:46,129 --> 00:20:42,419

solid state systems chemical systems all

454

00:20:47,810 --> 00:20:46,139

involve these macroscopic potential

455

00:20:50,690 --> 00:20:47,820

gradients which arise spontaneously at

456

00:20:51,769 --> 00:20:50,700

equilibrium and so i think they share so

457

00:20:55,100 --> 00:20:51,779

much in common with what we already

458

00:20:57,800 --> 00:20:55,110

considered to be legitimate engines in

459

00:20:59,510 --> 00:20:57,810

this case it's also an atomic process

460

00:21:01,580 --> 00:20:59,520

can be very different like we've seen

461

00:21:04,070 --> 00:21:01,590

nature of quantum mechanics another

462

00:21:06,470 --> 00:21:04,080

thing from our macroscopic experience

463

00:21:08,900 --> 00:21:06,480

that that's right this this this invokes

464

00:21:10,730 --> 00:21:08,910

biomechanics and safaris you have you

465

00:21:13,070 --> 00:21:10,740

have band structures and so on yes rival

466

00:21:16,010 --> 00:21:13,080

limited energy states to distribute the

467

00:21:17,960 --> 00:21:16,020

time right listen that is the case

468

00:21:20,000 --> 00:21:17,970

nonetheless these are not based on

469

00:21:21,800 --> 00:21:20,010

fluctuations this is not a Maxwell demon

470

00:21:23,570 --> 00:21:21,810

there's not information being processed

471

00:21:26,780 --> 00:21:23,580

here by some sort of thinking creature

472

00:21:31,090 --> 00:21:26,790

this this this kind of machine doesn't

473

00:21:36,950 --> 00:21:34,760

yeah yes the water falls off the falls

474

00:21:39,020 --> 00:21:36,960

off down damn and Drazen truth and so on

475

00:21:41,060 --> 00:21:39,030

Roger requires another source to get

476

00:21:43,430 --> 00:21:41,070

that water back up to the top okay

477

00:21:44,810 --> 00:21:43,440

sometimes gotta cause rain the rain then

478

00:21:49,520 --> 00:21:44,820

falls and he pisses me going is the

479

00:21:50,870 --> 00:21:49,530

sound of driving that's correct okay so

480

00:21:54,530 --> 00:21:50,880

so what you're saying is that you're

481

00:21:56,150 --> 00:21:54,540

you're exhausting a free energy system

482

00:21:57,740 --> 00:21:56,160

which and ultimately is the Sun fusion

483

00:21:58,880 --> 00:21:57,750

energy to create the sunlight which

484

00:22:00,470 --> 00:21:58,890

creates evaporation creates

485

00:22:01,790 --> 00:22:00,480

gravitational potential energy there is

486

00:22:03,260 --> 00:22:01,800

a difference that's right and that's why

487

00:22:05,110 --> 00:22:03,270

I always violates the second law and the

488

00:22:07,460 --> 00:22:05,120

other ones don't is because I was

489

00:22:09,050 --> 00:22:07,470

regenerate themselves through strictly

490

00:22:10,280 --> 00:22:09,060

thermal processes and that and so it

491

00:22:11,420 --> 00:22:10,290

kind of begs the question to say well

492

00:22:12,650 --> 00:22:11,430

they're different they are different

493

00:22:15,470 --> 00:22:12,660

because one violate the second law and

494

00:22:25,700 --> 00:22:15,480

the other one doesn't but the processes

495

00:22:31,020 --> 00:22:29,460

that's correct that's right if we're

496

00:22:32,700 --> 00:22:31,030

getting energy out of our system you

497

00:22:34,590 --> 00:22:32,710

actually play the first law against the

498

00:22:36,450 --> 00:22:34,600

second if you can if you can demonstrate

499

00:22:38,490 --> 00:22:36,460

the other work cycle that creates work

500

00:22:39,870 --> 00:22:38,500

there are two places the system can get

501
00:22:41,580 --> 00:22:39,880
work you can get it from internal energy

502
00:22:44,910 --> 00:22:41,590
or can get it from it can get it from

503
00:22:46,170 --> 00:22:44,920
heat and if you if you track all this

504
00:22:47,430 --> 00:22:46,180
around you find that it has to come from

505
00:22:54,780 --> 00:22:47,440
heap because there's no other no other

506
00:22:56,880 --> 00:22:54,790
place for it to come really yes that's a

507
00:23:00,000 --> 00:22:56,890
good let's start with that idea okay so

508
00:23:01,560 --> 00:23:00,010
let's let's say we had a series of

509
00:23:03,900 --> 00:23:01,570
second law violators and enough to fit

510
00:23:05,760 --> 00:23:03,910
into a can size of a coffee can if you

511
00:23:07,440 --> 00:23:05,770
were to draw in air from one side at

512
00:23:09,090 --> 00:23:07,450
about five meters a second and then and

513
00:23:11,370 --> 00:23:09,100

then cool the air as it comes to and

514

00:23:13,770 --> 00:23:11,380

loses its the air loses heat of let's

515

00:23:15,630 --> 00:23:13,780

say 10 or 15 degrees on this generator

516

00:23:18,690 --> 00:23:15,640

would produce probably about if you

517

00:23:20,430 --> 00:23:18,700

couple kilowatts of power so you could

518

00:23:21,780 --> 00:23:20,440

basically run a typical us household on

519

00:23:24,540 --> 00:23:21,790

average with something about the size of

520

00:23:27,390 --> 00:23:24,550

a can so what would happen is that it

521

00:23:29,360 --> 00:23:27,400

would draw air in from the room crew it

522

00:23:31,890 --> 00:23:29,370

turn that that heat into electricity

523

00:23:34,500 --> 00:23:31,900

that electricity would be distributed to

524

00:23:36,750 --> 00:23:34,510

the computers to the ovens to the TV

525

00:23:39,390 --> 00:23:36,760

sets to everything else which ultimately

526

00:23:41,220 --> 00:23:39,400

turns up is heat and therefore would

527

00:23:42,930 --> 00:23:41,230

come back into the room so aside from

528

00:23:46,160 --> 00:23:42,940

the initial startup of just a little bit

529

00:23:48,270 --> 00:23:46,170

of cooling your room runs basically

530

00:23:51,120 --> 00:23:48,280

perpetually by just on its own heat

531

00:23:53,990 --> 00:23:51,130

recycling it your air conditioner runs

532

00:23:58,850 --> 00:23:54,000

the rest of your house that's right yeah

533

00:24:04,620 --> 00:24:02,540

resources they seem to think that it's

534

00:24:06,180 --> 00:24:04,630

sufficient to demonstrate that you can

535

00:24:07,800 --> 00:24:06,190

produce eat because then you can run a

536

00:24:11,400 --> 00:24:07,810

car no end or something more

537

00:24:14,880 --> 00:24:11,410

sophisticated if your second law

538

00:24:18,960 --> 00:24:14,890

violators are drawing on to produce

539

00:24:22,140 --> 00:24:18,970

their motion burning image is not going

540

00:24:25,020 --> 00:24:22,150

to be very useful so how do you plan to

541

00:24:30,940 --> 00:24:25,030

get any energy out of this astronomical

542

00:24:37,490 --> 00:24:33,890

right this this in principle this can be

543

00:24:39,230 --> 00:24:37,500

written series of parallel to to build

544

00:24:41,780 --> 00:24:39,240

applied your current advantages in

545

00:24:43,910 --> 00:24:41,790

principle you could your various ways an

546

00:24:45,200 --> 00:24:43,920

extract of taking this mechanical energy

547

00:24:46,760 --> 00:24:45,210

and transducing it you can use piezo

548

00:24:48,640 --> 00:24:46,770

electrics you could use faraday

549

00:24:50,720 --> 00:24:48,650

induction their various ideas for that

550

00:24:52,790 --> 00:24:50,730

but there are other other ways of

551

00:24:54,140 --> 00:24:52,800

exploiting this these potential

552

00:24:55,970 --> 00:24:54,150

differences to you can use them to drive

553

00:24:57,170 --> 00:24:55,980

a lot of chemical reactions so in

554

00:24:58,970 --> 00:24:57,180

principle you could you could have gas

555

00:25:00,140 --> 00:24:58,980

phase I on a chemical reactions which

556

00:25:01,910 --> 00:25:00,150

are being driven and so you could just

557

00:25:04,760 --> 00:25:01,920

have a small Power Cell here recycles

558

00:25:06,410 --> 00:25:04,770

chemicals through using these electric

559

00:25:08,030 --> 00:25:06,420

fields to build a pyre energy chemical

560

00:25:10,010 --> 00:25:08,040

products which are then burnt and then

561

00:25:11,120 --> 00:25:10,020

create electricity that way so in that

562

00:25:12,560 --> 00:25:11,130

sense you wouldn't even have to build

563

00:25:14,960 --> 00:25:12,570

microscopic devices you can post only

564

00:25:16,880 --> 00:25:14,970

macroscopic basically a specialized

565

00:25:18,410 --> 00:25:16,890

catalyst so this is mainly for

566

00:25:19,910 --> 00:25:18,420

demonstration purposes this is something

567

00:25:21,290 --> 00:25:19,920

that could be tested and demonstrate the

568

00:25:23,200 --> 00:25:21,300

principle and there will be a lot of

569

00:25:25,520 --> 00:25:23,210

environment so that I suspect I presume

570

00:25:38,900 --> 00:25:25,530

could we get you to swap these and all

571

00:25:42,440 --> 00:25:38,910

yesterday I have a question yes I'll be

572

00:25:47,450 --> 00:25:42,450

so zero point energy systems predicated

573

00:25:49,520 --> 00:25:47,460

upon closed systems or open systems over

574

00:25:52,340 --> 00:25:49,530

there are based on closed system where

575

00:25:59,330 --> 00:25:52,350

is an example of closed system and if

576

00:26:02,360 --> 00:25:59,340

they are based an open system how I

577

00:26:04,910 --> 00:26:02,370

thought of a captain nope or give a

578

00:26:07,370 --> 00:26:04,920

second law devices at this point I yeah

579

00:26:08,330 --> 00:26:07,380

but I mean yeah also O'Gara can probe

580

00:26:11,630 --> 00:26:08,340

dirty could probably answer that

581

00:26:14,350 --> 00:26:11,640

question well discussion zero-point

582

00:26:16,330 --> 00:26:14,360

energy casa para show

583

00:26:18,730 --> 00:26:16,340

upon a gradient that exists in nature

584

00:26:20,350 --> 00:26:18,740

that is the difference between me zero

585

00:26:21,970 --> 00:26:20,360

point energy outside Casper Academy this

586

00:26:24,010 --> 00:26:21,980

stuff it's very different dad's talking

587

00:26:25,840 --> 00:26:24,020

about I think we finally finishing this

588

00:26:28,360 --> 00:26:25,850

custom second law before you answer to

589

00:26:31,870 --> 00:26:28,370

discussion about internal energy but

590

00:26:36,640 --> 00:26:31,880

everything thermal energy going

591

00:26:38,740 --> 00:26:36,650

someplace and that must be believed

592

00:26:46,710 --> 00:26:38,750

no it's nothing to do it

593

00:26:52,210 --> 00:26:50,529

boiling of water well it dissipates into

594

00:26:59,940 --> 00:26:52,220

the environment in a way that we just

595

00:27:03,310 --> 00:26:59,950

don't recognize where it goes well it

596

00:27:06,610 --> 00:27:03,320

within our system here that the earth

597

00:27:08,230 --> 00:27:06,620

radiates heat out into space on the dark

598

00:27:14,590 --> 00:27:08,240

side of the planet when the Sun isn't

599

00:27:16,960 --> 00:27:14,600

shining light no no not really no the

600

00:27:20,710 --> 00:27:16,970

earth is actually a giant here a giant

601
00:27:24,250 --> 00:27:20,720
heat engine if you want to look at 0

602
00:27:29,740 --> 00:27:24,260
plan or geo resources they were then for

603
00:27:31,779 --> 00:27:29,750
boggy he's dissipated it it diffuses

604
00:27:34,090 --> 00:27:31,789
into out into the solar system in

605
00:27:36,850 --> 00:27:34,100
universe where is that distant points in

606
00:27:38,529 --> 00:27:36,860
our galaxy we can look and some other

607
00:27:40,029 --> 00:27:38,539
intelligent being can look this way and

608
00:27:42,190 --> 00:27:40,039
say oh I see a fair amount of infrared

609
00:27:46,590 --> 00:27:42,200
energy coming off those planets by this

610
00:27:54,370 --> 00:27:46,600
star we call the sign here so it's it

611
00:27:56,560 --> 00:27:54,380
sure sure it's legitimate that's allow

612
00:27:59,140 --> 00:27:56,570
me to cool the only discussion first

613
00:28:02,080 --> 00:27:59,150

second yep if anybody in the audience

614

00:28:04,360 --> 00:28:02,090

has not picked up a package of sse

615

00:28:07,870 --> 00:28:04,370

business cards give your friends and

616

00:28:11,490 --> 00:28:07,880

neighbors i've got a few left so please

617

00:28:17,320 --> 00:28:11,500

come see me if you haven't picked one up

618

00:28:21,870 --> 00:28:17,330

hang on hang on I'm not done my biggest

619

00:28:25,450 --> 00:28:21,880

concern with all of this is the

620

00:28:28,510 --> 00:28:25,460

emotional political influence on good

621

00:28:30,460 --> 00:28:28,520

science that is to a large extent

622

00:28:33,580 --> 00:28:30,470

ripping this country and the rest of the

623

00:28:37,600 --> 00:28:33,590

world apart Spain is going broke because

624

00:28:42,010 --> 00:28:37,610

they invested heavily in windmills acres

625

00:28:47,320 --> 00:28:42,020

and square miles of photovoltaic oval

626

00:28:49,630 --> 00:28:47,330

take energy systems are stupid what I

627

00:28:52,120 --> 00:28:49,640

expect to happen is we'll have all the

628

00:28:55,570 --> 00:28:52,130

deserts covered with photocells and

629

00:28:57,490 --> 00:28:55,580

windmills on every corner and then cold

630

00:28:59,230 --> 00:28:57,500

fusion will go commercial

631

00:29:01,390 --> 00:28:59,240

will be the end of it well another thing

632

00:29:03,130 --> 00:29:01,400

will what another thing will stall the

633

00:29:05,350 --> 00:29:03,140

wind and solar is that we still haven't

634

00:29:09,070 --> 00:29:05,360

solved the storage problem of nights and

635

00:29:10,540 --> 00:29:09,080

storm buddy well when we draw on some of

636

00:29:13,000 --> 00:29:10,550

the expertise in the audience what where

637

00:29:14,710 --> 00:29:13,010

do you see sociologically what do you

638

00:29:16,930 --> 00:29:14,720

think the ramifications would be of a

639

00:29:18,460 --> 00:29:16,940

breakthrough in this is it would it be

640

00:29:21,790 --> 00:29:18,470

ignored would it be embraced would it be

641

00:29:23,650 --> 00:29:21,800

squashed with you that's a really good

642

00:29:29,560 --> 00:29:23,660

question I wanted to dance ask that all

643

00:29:32,590 --> 00:29:29,570

day today I in the classes I have a Utah

644

00:29:36,700 --> 00:29:32,600

Valley University I teach about you know

645

00:29:38,860 --> 00:29:36,710

these kinds of a zero-point field and

646

00:29:41,020 --> 00:29:38,870

all of these different things to get

647

00:29:42,840 --> 00:29:41,030

energy and the question I asked because

648

00:29:47,530 --> 00:29:42,850

one of them asked that very question

649

00:29:52,330 --> 00:29:47,540

what are the sociological ramifications

650

00:29:55,480 --> 00:29:52,340

of being successful and we make that a

651
00:29:56,980 --> 00:29:55,490
group project to decide what would be

652
00:29:59,830 --> 00:29:56,990
the things one of the one of the thought

653
00:30:05,170 --> 00:29:59,840
experiments is suppose you do get good

654
00:30:06,910 --> 00:30:05,180
clean energy unlimited what walk down

655
00:30:10,210 --> 00:30:06,920
the street or drive down the street and

656
00:30:12,970 --> 00:30:10,220
say what would still be there and what

657
00:30:15,340 --> 00:30:12,980
would be gone and so that's a very good

658
00:30:19,330 --> 00:30:15,350
question what most of the things that

659
00:30:20,860 --> 00:30:19,340
they say is everybody's going to lose

660
00:30:22,750 --> 00:30:20,870
their job and that's the thing that

661
00:30:25,210 --> 00:30:22,760
they're worried about course now they're

662
00:30:27,520 --> 00:30:25,220
speaking from half of them not having a

663
00:30:29,440 --> 00:30:27,530

job at the present time that's right

664

00:30:31,540 --> 00:30:29,450

well that was a case with the origin

665

00:30:33,550 --> 00:30:31,550

carriage and disagree with you deal you

666

00:30:35,110 --> 00:30:33,560

can look closer far all right Kim I'm

667

00:30:37,030 --> 00:30:35,120

sorry yeah it's a wee front through that

668

00:30:39,430 --> 00:30:37,040

situation time and time again with the

669

00:30:40,780 --> 00:30:39,440

evolution of society just a hundred

670

00:30:43,060 --> 00:30:40,790

years ago the horse and carriage

671

00:30:45,730 --> 00:30:43,070

industry when essentially closed their

672

00:30:47,110 --> 00:30:45,740

business one tenth of what it was at the

673

00:30:48,970 --> 00:30:47,120

introduction of the automobile yet

674

00:30:51,610 --> 00:30:48,980

history recounts no losers of people

675

00:30:53,020 --> 00:30:51,620

being left behind and how about say six

676
00:30:55,120 --> 00:30:53,030
hundred years ago when I pane glass

677
00:30:57,130 --> 00:30:55,130
windows were invented and that the

678
00:31:00,550 --> 00:30:57,140
candle makers guild were put out of

679
00:31:02,200 --> 00:31:00,560
business history recounts no losers

680
00:31:04,750 --> 00:31:02,210
there they just had to change their

681
00:31:06,700 --> 00:31:04,760
careers right and but you can

682
00:31:08,710 --> 00:31:06,710
but you can see short-term problems

683
00:31:11,950 --> 00:31:08,720
certainly I mean if you were to let's

684
00:31:13,660 --> 00:31:11,960
say if a burn Ian and Garrett are

685
00:31:16,090 --> 00:31:13,670
successful and they can create let's say

686
00:31:18,010 --> 00:31:16,100
a handheld device that can put out five

687
00:31:19,810 --> 00:31:18,020
kilowatts of power or one of our devices

688
00:31:22,080 --> 00:31:19,820

second our devices ken's or someone

689

00:31:25,860 --> 00:31:22,090

else's does the same you could basically

690

00:31:29,230 --> 00:31:25,870

unplug almost a commercial buildings and

691

00:31:30,820 --> 00:31:29,240

it houses all residential from the grid

692

00:31:33,280 --> 00:31:30,830

you would you would do away with the oil

693

00:31:35,290 --> 00:31:33,290

and gas industry you would see the

694

00:31:37,090 --> 00:31:35,300

influence of the mideast disappeared

695

00:31:40,110 --> 00:31:37,100

those they would disappear back into the

696

00:31:42,070 --> 00:31:40,120

sands on it would it would destabilize

697

00:31:44,950 --> 00:31:42,080

geopolitically large parts of the world

698

00:31:46,830 --> 00:31:44,960

Russia would loses influence with with

699

00:31:49,360 --> 00:31:46,840

its gas production over Western Europe

700

00:31:51,160 --> 00:31:49,370

well how the holiday regain their

701
00:31:52,240 --> 00:31:51,170
stature if they don't have an economical

702
00:31:54,970 --> 00:31:52,250
ever would they have with you become

703
00:31:57,700 --> 00:31:54,980
military there be all sorts of very

704
00:31:58,930 --> 00:31:57,710
profound changes at the same time you

705
00:32:00,910 --> 00:31:58,940
would he would you you could possibly

706
00:32:02,380 --> 00:32:00,920
lower if you had unlimited amounts of

707
00:32:04,750 --> 00:32:02,390
energy available to you you could start

708
00:32:06,970 --> 00:32:04,760
making co2 scrubbers bring the co2 back

709
00:32:11,410 --> 00:32:06,980
down 270 parts per million rather than

710
00:32:14,200 --> 00:32:11,420
380 where it is now you could forestall

711
00:32:16,720 --> 00:32:14,210
a global warming cool the oceans you do

712
00:32:18,430 --> 00:32:16,730
all sorts of things clean water you

713
00:32:20,080 --> 00:32:18,440

would if you could purify water or

714

00:32:21,130 --> 00:32:20,090

simply condense it out of the air you

715

00:32:22,420 --> 00:32:21,140

would solve though you know an average

716

00:32:24,400 --> 00:32:22,430

person in the world spends two or three

717

00:32:26,080 --> 00:32:24,410

hours in poor countries looking for

718

00:32:28,150 --> 00:32:26,090

water every day you transform everything

719

00:32:29,020 --> 00:32:28,160

good and bad but certainly be disruptive

720

00:32:30,730 --> 00:32:29,030

and I can't think of anything more

721

00:32:33,070 --> 00:32:30,740

disruptive than changing the way energy

722

00:32:35,710 --> 00:32:33,080

is produced and once energy becomes free

723

00:32:37,540 --> 00:32:35,720

we can solve the water crises in many

724

00:32:39,730 --> 00:32:37,550

places the world and the food run albums

725

00:32:41,980 --> 00:32:39,740

to write energies behind everything

726

00:32:43,660 --> 00:32:41,990

closer to shirt on your back well every

727

00:32:45,730 --> 00:32:43,670

every every spoonful of food you put

728

00:32:47,200 --> 00:32:45,740

into your mouth has roughly 20 grams of

729

00:32:49,450 --> 00:32:47,210

petroleum behind it in terms of

730

00:32:50,770 --> 00:32:49,460

transportation costs fertilizer or

731

00:32:52,630 --> 00:32:50,780

grilling costs and all that so you're

732

00:32:54,340 --> 00:32:52,640

putting 20 grams of oil into your mouth

733

00:32:58,480 --> 00:32:54,350

every time you take a spoonful of food

734

00:33:01,540 --> 00:32:58,490

it's just it's tremendous places where

735

00:33:03,340 --> 00:33:01,550

the energy goes that's all right my name

736

00:33:06,060 --> 00:33:03,350

is John ran with open minds and open

737

00:33:09,330 --> 00:33:06,070

minds TV

738

00:33:11,670 --> 00:33:09,340

there's a couple of energy sources that

739

00:33:15,900 --> 00:33:11,680

I wanted you to be aware of one of them

740

00:33:20,970 --> 00:33:15,910

was a patent by jaeger lecoultre they

741

00:33:24,600 --> 00:33:20,980

invented an Atmos clock and an atlas

742

00:33:27,720 --> 00:33:24,610

clock using a accordion type cylinder

743

00:33:31,110 --> 00:33:27,730

which expanded and contracted with

744

00:33:34,820 --> 00:33:31,120

temperature changes one of those little

745

00:33:38,760 --> 00:33:34,830

cylinders the size of the size of a

746

00:33:40,980 --> 00:33:38,770

teacup can actually lift a human being

747

00:33:44,760 --> 00:33:40,990

just by changing the temperature with a

748

00:33:47,250 --> 00:33:44,770

little can of air spray that that was

749

00:33:50,730 --> 00:33:47,260

called a perpetual clock and that

750

00:33:56,010 --> 00:33:50,740

technology exists the other one is using

751

00:34:00,420 --> 00:33:56,020

solar park xerox a year ago came out

752

00:34:03,690 --> 00:34:00,430

with a new type of a satellite it looked

753

00:34:08,280 --> 00:34:03,700

like a second dish but it focused a beam

754

00:34:10,770 --> 00:34:08,290

to to a type of element which was 100

755

00:34:13,530 --> 00:34:10,780

times more efficient than anything that

756

00:34:17,190 --> 00:34:13,540

we have in solar cells that patent was

757

00:34:20,310 --> 00:34:17,200

sold for over 100 million dollars last

758

00:34:23,220 --> 00:34:20,320

year I couldn't get the the type of

759

00:34:26,040 --> 00:34:23,230

material it used but that's uh that's

760

00:34:28,800 --> 00:34:26,050

probably one of the interesting things

761

00:34:31,920 --> 00:34:28,810

about the solar panel another one is the

762

00:34:35,550 --> 00:34:31,930

bloom box these boom boxes are appearing

763

00:34:38,400 --> 00:34:35,560

in front of google and ebay and a

764

00:34:41,280 --> 00:34:38,410

tremendous amount of energy output for a

765

00:34:43,940 --> 00:34:41,290

very small amount of resources going in

766

00:34:47,910 --> 00:34:43,950

almost working on almost any type of

767

00:34:49,860 --> 00:34:47,920

fuel are any of you aware of this yeah

768

00:34:51,510 --> 00:34:49,870

all of those are free energy sources

769

00:34:53,040 --> 00:34:51,520

though they all require free energy

770

00:34:54,660 --> 00:34:53,050

they're not going to store more

771

00:34:56,250 --> 00:34:54,670

efficient maybe but they're not the

772

00:34:59,160 --> 00:34:56,260

bloom back city is talking about is

773

00:35:01,140 --> 00:34:59,170

actually a very successful commercial

774

00:35:02,700 --> 00:35:01,150

fuel cell but they're still there's

775

00:35:04,380 --> 00:35:02,710

still a fuel cell I know that's right

776

00:35:06,150 --> 00:35:04,390

now so I think there's still some where

777

00:35:08,190 --> 00:35:06,160

around sixty percent efficiency and

778

00:35:10,450 --> 00:35:08,200

forty percent test to be discharged as

779

00:35:13,060 --> 00:35:10,460

heat into the environment I mean it

780

00:35:14,020 --> 00:35:13,070

comment2 about the solar concentrating

781

00:35:16,120 --> 00:35:14,030

solar cause you no good whatsoever

782

00:35:18,430 --> 00:35:16,130

because you only have so much watts per

783

00:35:20,170 --> 00:35:18,440

square meter and that's that's it in

784

00:35:22,500 --> 00:35:20,180

concentrate if you want to and they have

785

00:35:24,820 --> 00:35:22,510

some effect on the efficiency of the

786

00:35:26,890 --> 00:35:24,830

conversion but you're limited by the

787

00:35:28,030 --> 00:35:26,900

amount of the solar energy coming per

788

00:35:30,579 --> 00:35:28,040

square meter you can't do anything about

789

00:35:33,640 --> 00:35:30,589

that move the earth closer to the Sun

790

00:35:35,589 --> 00:35:33,650

you by the way that clock they're

791

00:35:37,660 --> 00:35:35,599

talking about that operates with the

792

00:35:39,640 --> 00:35:37,670

bellows is just simply it's a heat

793

00:35:42,010 --> 00:35:39,650

engine that operates over a day long

794

00:35:44,740 --> 00:35:42,020

cycle of absorbing heat and getting rid

795

00:35:48,520 --> 00:35:44,750

of heat that concept of centuries-old

796

00:35:53,740 --> 00:35:48,530

actually um my name is John rhythm the

797

00:35:56,470 --> 00:35:53,750

treasure of SSC comment and question is

798

00:35:59,200 --> 00:35:56,480

this we've been discussing a new energy

799

00:36:02,800 --> 00:35:59,210

sources and it's it seems like the focus

800

00:36:05,290 --> 00:36:02,810

has been on rather exotic and the

801
00:36:10,089 --> 00:36:05,300
sources such as the cpe Casimir effect

802
00:36:15,599 --> 00:36:10,099
and others I'm wondering and if if you

803
00:36:18,280 --> 00:36:15,609
could tell the audience if there's any

804
00:36:21,160 --> 00:36:18,290
very revolutionary research being done

805
00:36:23,560 --> 00:36:21,170
on fuels that can be used in

806
00:36:25,540 --> 00:36:23,570
conventional engines that already exist

807
00:36:28,690 --> 00:36:25,550
and are being used worldwide such as

808
00:36:32,020 --> 00:36:28,700
internal combustion engines and an

809
00:36:34,660 --> 00:36:32,030
especially fuels like the use of

810
00:36:36,960 --> 00:36:34,670
hydrogen which the Germans were using in

811
00:36:40,060 --> 00:36:36,970
World War two when they didn't have

812
00:36:43,690 --> 00:36:40,070
petroleum sources of fuel to operate

813
00:36:46,380 --> 00:36:43,700

their combustion engine so it do you

814

00:36:51,750 --> 00:36:46,390

have any research is being done on

815

00:36:55,950 --> 00:36:51,760

methods of hydrolysis of water or other

816

00:36:59,560 --> 00:36:55,960

such you know fairly freely available

817

00:37:02,170 --> 00:36:59,570

substances that we have so that the that

818

00:37:04,810 --> 00:37:02,180

it could produce essentially a free

819

00:37:07,240 --> 00:37:04,820

source of energy by mate because the

820

00:37:10,060 --> 00:37:07,250

source of the fuel would be so cheap but

821

00:37:11,859 --> 00:37:10,070

could through hydrolysis have a source

822

00:37:13,810 --> 00:37:11,869

of hydrogen that could go into the

823

00:37:15,190 --> 00:37:13,820

internal combustion engines and and

824

00:37:17,050 --> 00:37:15,200

operate

825

00:37:18,760 --> 00:37:17,060

you know with conventional technology

826

00:37:21,670 --> 00:37:18,770

without some of the exotics that we've

827

00:37:25,180 --> 00:37:21,680

been discussing I just I think number of

828

00:37:28,900 --> 00:37:25,190

us will give you responses one I like a

829

00:37:33,839 --> 00:37:28,910

lot is an air powered car something

830

00:37:39,730 --> 00:37:33,849

that's been worked on connect a french

831

00:37:42,190 --> 00:37:39,740

engineer for quite a long time and my

832

00:37:44,050 --> 00:37:42,200

thermodynamics class we actually started

833

00:37:47,530 --> 00:37:44,060

off the class by doing an analysis of

834

00:37:51,220 --> 00:37:47,540

his engine and see how much energy you

835

00:37:54,790 --> 00:37:51,230

can get and it's very small but it's

836

00:37:59,530 --> 00:37:54,800

actually practical and he's now building

837

00:38:01,990 --> 00:37:59,540

these in tanta the Indian today our car

838

00:38:04,060 --> 00:38:02,000

maker has contracted with in there

839

00:38:06,460 --> 00:38:04,070

apparently in production for these

840

00:38:12,550 --> 00:38:06,470

air-powered cars they do think of have a

841

00:38:14,620 --> 00:38:12,560

fuel backup as well that's one minor you

842

00:38:16,839 --> 00:38:14,630

get a little bit more mileage afib used

843

00:38:18,760 --> 00:38:16,849

a store liquid nitrogen on board as

844

00:38:20,859 --> 00:38:18,770

opposed to just compressed air because

845

00:38:24,520 --> 00:38:20,869

then you can enlist thermal energy to

846

00:38:25,990 --> 00:38:24,530

boil for the ln_2 I would think it

847

00:38:27,760 --> 00:38:26,000

puzzles me is why we don't make more use

848

00:38:29,740 --> 00:38:27,770

of the same technologies being used in

849

00:38:32,680 --> 00:38:29,750

Brazil instead of using corn to make

850

00:38:34,510 --> 00:38:32,690

ethanol there's very not very very

851

00:38:36,069 --> 00:38:34,520

efficient and clear but they're actually

852

00:38:37,390 --> 00:38:36,079

gaining anything by doing that why are

853

00:38:38,440 --> 00:38:37,400

we not using sugar cane which is about

854

00:38:40,270 --> 00:38:38,450

competitive

855

00:38:46,089 --> 00:38:40,280

vision it's made Latrell pretty much

856

00:38:48,250 --> 00:38:46,099

energy okay then i would say that even

857

00:38:49,990 --> 00:38:48,260

if you could find these fuels your

858

00:38:51,430 --> 00:38:50,000

there's still free energy sources which

859

00:38:53,950 --> 00:38:51,440

have an efficiency associated with them

860

00:38:56,319 --> 00:38:53,960

which is thermodynamically mandated and

861

00:38:58,420 --> 00:38:56,329

so if you can improve your efficiency by

862

00:39:00,220 --> 00:38:58,430

ten percent fine then you drive an SUV

863

00:39:02,819 --> 00:39:00,230

which uses twenty percent more gas as a

864

00:39:05,170 --> 00:39:02,829

result in you're simply behind the curve

865

00:39:08,170 --> 00:39:05,180

even the way energy is being used right

866

00:39:12,130 --> 00:39:08,180

now and the demand for it there will not

867

00:39:14,109 --> 00:39:12,140

be enough by the conventional sources or

868

00:39:15,760 --> 00:39:14,119

even the ones or anything like the

869

00:39:17,260 --> 00:39:15,770

conventional sources and if we use them

870

00:39:27,819 --> 00:39:17,270

as we are currently using will destroy

871

00:39:29,410 --> 00:39:27,829

the planet that's right 200 yes okay let

872

00:39:32,050 --> 00:39:29,420

me out let me address that directly yeah

873

00:39:34,180 --> 00:39:32,060

if you tip if you want to break if you

874

00:39:35,650 --> 00:39:34,190

want to if you want to break water down

875

00:39:37,420 --> 00:39:35,660

into hydrogen and oxygen it requires

876

00:39:39,550 --> 00:39:37,430

energy to do so which means you have to

877

00:39:40,720 --> 00:39:39,560

provide that electrical energy and that

878

00:39:42,220 --> 00:39:40,730

electrical energy would come from the

879

00:39:43,809 --> 00:39:42,230

burning of coal or gas or oil or

880

00:39:45,309 --> 00:39:43,819

something else and that in itself is

881

00:39:47,589 --> 00:39:45,319

going to be inefficient and then you go

882

00:39:49,089 --> 00:39:47,599

through the extra step of breaking down

883

00:39:51,099 --> 00:39:49,099

the gas and you have to pressurize

884

00:39:52,180 --> 00:39:51,109

accrue it all of that in the end it

885

00:39:53,800 --> 00:39:52,190

doesn't do you any good all does is

886

00:39:55,750 --> 00:39:53,810

remove the pollution source from one

887

00:40:23,220 --> 00:39:55,760

place to another but but it doesn't get

888

00:40:28,500 --> 00:40:26,280

okay sure if you if you if you use the

889

00:40:30,590 --> 00:40:28,510

catalyst interview to question the and

890

00:40:33,300 --> 00:40:30,600

your if are there any are there any

891

00:40:34,770 --> 00:40:33,310

breakthroughs breakthroughs that can be

892

00:40:37,020 --> 00:40:34,780

used with conventional energy sources

893

00:40:39,540 --> 00:40:37,030

for instance electrolysis of water let's

894

00:40:41,670 --> 00:40:39,550

say catalogs breakdown of it yes the

895

00:40:43,320 --> 00:40:41,680

catalysts don't shift the equilibrium

896

00:40:45,450 --> 00:40:43,330

they don't they don't give you any extra

897

00:40:46,770 --> 00:40:45,460

or any free energy so you're still going

898

00:40:47,970 --> 00:40:46,780

to have to pay the energy costs of

899

00:40:49,560 --> 00:40:47,980

breaking it down you might be able to do

900

00:40:51,150 --> 00:40:49,570

it more efficiently more quickly you can

901
00:40:52,260 --> 00:40:51,160
lower the activation energy for doing so

902
00:40:54,240 --> 00:40:52,270
you're not going to change the actual

903
00:40:57,720 --> 00:40:54,250
energy costs in doing so so you're just

904
00:40:59,820 --> 00:40:57,730
adding to that you know there if you

905
00:41:02,460 --> 00:40:59,830
look online you'll find a number of

906
00:41:04,770 --> 00:41:02,470
water powered cars yes I was about to

907
00:41:07,440 --> 00:41:04,780
say we need to address that i stand here

908
00:41:09,420 --> 00:41:07,450
saying that as rush i do took you you

909
00:41:12,240 --> 00:41:09,430
can you can look at a person farming

910
00:41:14,550 --> 00:41:12,250
table for water and just as daniel said

911
00:41:16,470 --> 00:41:14,560
you know no matter how you get from here

912
00:41:19,140 --> 00:41:16,480
to there there's just a certain amount

913
00:41:22,650 --> 00:41:19,150

of energy involved in in the bonding

914

00:41:24,450 --> 00:41:22,660

process and we can't change that now it

915

00:41:27,960 --> 00:41:24,460

may be possible that adding water

916

00:41:29,910 --> 00:41:27,970

gasoline improves Oh yo stepped out

917

00:41:32,450 --> 00:41:29,920

religions that's been demonstrated him

918

00:41:36,390 --> 00:41:32,460

statuses and that's been demonstrated

919

00:41:38,940 --> 00:41:36,400

but there are there let me tell you one

920

00:41:41,520 --> 00:41:38,950

that actually does work and excuse me

921

00:41:42,870 --> 00:41:41,530

Olga was in my class for quoting

922

00:41:46,140 --> 00:41:42,880

something else from the class that was

923

00:41:49,500 --> 00:41:46,150

we were thinking what happens if you

924

00:41:52,490 --> 00:41:49,510

take water and you evaporate it that

925

00:41:54,900 --> 00:41:52,500

will cool that will give you

926

00:41:58,890 --> 00:41:54,910

cult which is the opposite of a female

927

00:42:00,990 --> 00:41:58,900

my guest yes and then you use that with

928

00:42:03,360 --> 00:42:01,000

a Stirling engine or some some attention

929

00:42:04,980 --> 00:42:03,370

and you use the cold that you jam it

930

00:42:07,410 --> 00:42:04,990

doesn't matter if you put heat in or

931

00:42:11,640 --> 00:42:07,420

take it out it's still flow that's all

932

00:42:17,850 --> 00:42:11,650

right I just want to oh so let's say

933

00:42:20,670 --> 00:42:17,860

that you sew into it you make you make a

934

00:42:23,280 --> 00:42:20,680

gradient so you've got cold and eat and

935

00:42:24,840 --> 00:42:23,290

you use that to drive a Stirling engine

936

00:42:27,000 --> 00:42:24,850

or something like that could you

937

00:42:29,790 --> 00:42:27,010

actually end up with a net energy game

938

00:42:31,980 --> 00:42:29,800

and the answer is yes you actually could

939

00:42:34,050 --> 00:42:31,990

build a motor that would work like this

940

00:42:35,790 --> 00:42:34,060

so then we did the calculation how much

941

00:42:38,820 --> 00:42:35,800

water would you need compared with

942

00:42:40,710 --> 00:42:38,830

gasoline so if you had a car running

943

00:42:41,820 --> 00:42:40,720

around instead of having a gas tank you

944

00:42:44,040 --> 00:42:41,830

at a water tank which you've evaporated

945

00:42:47,640 --> 00:42:44,050

it turns out it's about a factor of 100

946

00:42:50,070 --> 00:42:47,650

more than you need for gasoline so it

947

00:42:56,040 --> 00:42:50,080

really is not practical for a car engine

948

00:42:58,160 --> 00:42:56,050

however for a boat I don't know hello

949

00:43:00,240 --> 00:42:58,170

it's left if I to follow up on that

950

00:43:02,700 --> 00:43:00,250

exactly you're just saying first of all

951
00:43:05,760 --> 00:43:02,710
I appreciate the comment by Dan about

952
00:43:07,620 --> 00:43:05,770
efficiency that just getting more energy

953
00:43:09,090 --> 00:43:07,630
isn't going to change our consumption of

954
00:43:11,910 --> 00:43:09,100
it we do also have to focus on being

955
00:43:12,900 --> 00:43:11,920
efficient and using it well if we're

956
00:43:16,800 --> 00:43:12,910
going to ever solve the underlying

957
00:43:18,450 --> 00:43:16,810
problem but I just have this idea in and

958
00:43:20,550 --> 00:43:18,460
I it's not my fluid extra peat expertise

959
00:43:24,140 --> 00:43:20,560
so maybe I'll sound stupid but it's a

960
00:43:26,550 --> 00:43:24,150
good idea I don't when we burn gasoline

961
00:43:29,130 --> 00:43:26,560
it's a very primitive way of extracting

962
00:43:30,720 --> 00:43:29,140
the energy from the gasoline not cool or

963
00:43:33,570 --> 00:43:30,730

burning wood or things like that is

964

00:43:36,960 --> 00:43:33,580

other ways to perform the same chemical

965

00:43:38,820 --> 00:43:36,970

reactions in very efficient ways that

966

00:43:40,500 --> 00:43:38,830

are not called burning that sure you

967

00:43:41,850 --> 00:43:40,510

just make fuel cells for instance which

968

00:43:44,280 --> 00:43:41,860

would be highly efficient you know sixty

969

00:43:46,200 --> 00:43:44,290

eighty percent efficient I assume where

970

00:43:48,210 --> 00:43:46,210

you're you're not having to go through a

971

00:43:51,660 --> 00:43:48,220

work cycle in the same way yeah you can

972

00:43:53,970 --> 00:43:51,670

you could make ya a la hydrogen oxygen

973

00:43:55,740 --> 00:43:53,980

fuel cell is theoretically eighty-six

974

00:43:57,960 --> 00:43:55,750

percent efficient yeah but I'm

975

00:44:00,780 --> 00:43:57,970

suggesting literally breaking down the

976

00:44:01,370 --> 00:44:00,790

same gasoline molecules so if you use

977

00:44:03,500 --> 00:44:01,380

the same few

978

00:44:05,750 --> 00:44:03,510

and it doesn't produce a gaseous CO_2 and

979

00:44:08,210 --> 00:44:05,760

we can capture the carbon and because

980

00:44:09,440 --> 00:44:08,220

it's some kind of digestive process well

981

00:44:11,570 --> 00:44:09,450

sure if you could find a way to capture

982

00:44:14,240 --> 00:44:11,580

the carbon and as CO_2 sure that'd be

983

00:44:16,130 --> 00:44:14,250

great it's sequester it I assume that be

984

00:44:17,840 --> 00:44:16,140

possible sure well it's a lesson has to

985

00:44:19,670 --> 00:44:17,850

be gashes the real question is modeling

986

00:44:21,230 --> 00:44:19,680

you know our energy sources off of the

987

00:44:22,460 --> 00:44:21,240

way we digest food in the way that you

988

00:44:24,620 --> 00:44:22,470

know those chemical reactions happen

989

00:44:25,910 --> 00:44:24,630

rather than burning as a fundamental but

990

00:44:27,950 --> 00:44:25,920

I think fuel cell is probably one of the

991

00:44:30,680 --> 00:44:27,960

best ways to go on up yes our muscles

992

00:44:32,990 --> 00:44:30,690

are actually about 80 our muscles are

993

00:44:36,290 --> 00:44:33,000

about thirty percent efficient and

994

00:44:39,320 --> 00:44:36,300

conversion of hydrocarbons into muscle

995

00:44:41,630 --> 00:44:39,330

work and yet that's done with much lower

996

00:44:43,460 --> 00:44:41,640

temperatures than an engine but it's a

997

00:44:45,430 --> 00:44:43,470

whole different process of tapping that

998

00:44:48,320 --> 00:44:45,440

energy to Gibbs free energy

999

00:44:57,260 --> 00:44:48,330

transformation as opposed to a thermal

1000

00:45:06,110 --> 00:44:57,270

one combined it it's it's a battery with

1001
00:45:07,700 --> 00:45:06,120
potentially unlimited reactants yeah

1002
00:45:09,560 --> 00:45:07,710
there are many different types although

1003
00:45:11,180 --> 00:45:09,570
the hydrogen oxygen when is the cleanest

1004
00:45:13,580 --> 00:45:11,190
and the least susceptible to following

1005
00:45:16,850 --> 00:45:13,590
we still haven't solved the problem with

1006
00:45:18,230 --> 00:45:16,860
that dirty carbon-carbon bond place like

1007
00:45:20,300 --> 00:45:18,240
Iceland we have lots of geothermal

1008
00:45:21,620 --> 00:45:20,310
energy you can use that to bring the

1009
00:45:23,810 --> 00:45:21,630
part of the water and hydrogen oxygen

1010
00:45:25,490 --> 00:45:23,820
many values that to run your car's fuel

1011
00:45:26,750 --> 00:45:25,500
cell but you're actually then running

1012
00:45:28,059 --> 00:45:26,760
things off with the diff there whenever

1013
00:45:31,780 --> 00:45:28,069

you coming from

1014

00:45:39,220 --> 00:45:34,240

it sounds like it's time for me to go to

1015

00:45:41,200 --> 00:45:39,230

war on two fronts first Garrett recently

1016

00:45:43,750 --> 00:45:41,210

over the last five years like I worked

1017

00:45:45,730 --> 00:45:43,760

with a man that built air powered cars

1018

00:45:49,900 --> 00:45:45,740

you want to take a guess what a standard

1019

00:45:54,520 --> 00:45:49,910

high pressure gas tank the stand-up tank

1020

00:45:58,270 --> 00:45:54,530

with a screw off top with air at 3,000

1021

00:46:01,030 --> 00:45:58,280

psi what the energy storage value of

1022

00:46:02,980 --> 00:46:01,040

that is the calculations it's very

1023

00:46:05,710 --> 00:46:02,990

little that's one works roughly one

1024

00:46:09,070 --> 00:46:05,720

horsepower ality it's a much lower

1025

00:46:13,060 --> 00:46:09,080

density far lowered as a fuel source

1026

00:46:16,420 --> 00:46:13,070

than gasoline I guess this French

1027

00:46:19,720 --> 00:46:16,430

compressed air vehicle I've watched that

1028

00:46:24,430 --> 00:46:19,730

thing for like five years when you load

1029

00:46:26,050 --> 00:46:24,440

that thing up with 4500 PSI air you

1030

00:46:29,500 --> 00:46:26,060

increase the weight of the vehicle by

1031

00:46:32,590 --> 00:46:29,510

about 750 pounds and if one of those

1032

00:46:34,930 --> 00:46:32,600

tanks ruptures you either have the

1033

00:46:38,920 --> 00:46:34,940

world's most colossal rocket in center

1034

00:46:42,040 --> 00:46:38,930

city or one loud ass explosion yeah okay

1035

00:46:43,510 --> 00:46:42,050

that's what if it's hard it's hard to be

1036

00:46:45,040 --> 00:46:43,520

gasoline I mean when you look at the

1037

00:46:46,360 --> 00:46:45,050

actual chemical energy and gasoline is

1038

00:46:48,160 --> 00:46:46,370

higher when it's burned than high

1039

00:46:49,930 --> 00:46:48,170

explosives literally when you're feeling

1040

00:46:51,430 --> 00:46:49,940

your car up with gasoline you might as

1041

00:46:53,620 --> 00:46:51,440

well be filling it up with with the

1042

00:46:54,760 --> 00:46:53,630

plastique and you're just blowing your

1043

00:46:56,020 --> 00:46:54,770

way down the highway in a series of

1044

00:46:59,110 --> 00:46:56,030

explosions that's tremendously

1045

00:47:01,900 --> 00:46:59,120

energy-intensive right great admiration

1046

00:47:07,060 --> 00:47:01,910

respect for gasoline yeah I always start

1047

00:47:08,890 --> 00:47:07,070

fires with kerosene I Daniel I want to

1048

00:47:13,740 --> 00:47:08,900

take it one in two subjects number one

1049

00:47:16,990 --> 00:47:13,750

co2 is not a pollutant it's plain food

1050

00:47:18,970 --> 00:47:17,000

it's plant food without which pollutant

1051
00:47:23,650 --> 00:47:18,980
is a resource that is out of place that

1052
00:47:26,770 --> 00:47:23,660
includes quantity well look what the

1053
00:47:30,130 --> 00:47:26,780
quantity is very debatable because

1054
00:47:33,340 --> 00:47:30,140
apparently the the greenhouse effect

1055
00:47:36,550 --> 00:47:33,350
falls off with increased concentration

1056
00:47:38,290 --> 00:47:36,560
and Jay and water vapor is farmers yeah

1057
00:47:39,820 --> 00:47:38,300
well you might take it up at EPA I think

1058
00:47:43,630 --> 00:47:39,830
they listed it as a

1059
00:47:47,560 --> 00:47:43,640
the alone okay number two number

1060
00:47:51,270 --> 00:47:47,570
two ok how many coal-fired plants and

1061
00:47:54,820 --> 00:47:51,280
SUVs weather in the year one thousand

1062
00:47:56,260 --> 00:47:54,830
coal-burning plants yeah it's not the

1063
00:47:59,280 --> 00:47:56,270

number of plants is the amount of DC

1064

00:48:01,930 --> 00:47:59,290

medicated wats the 2001 years ago a

1065

00:48:05,590 --> 00:48:01,940

thousand years ago how many coal-fired

1066

00:48:07,810 --> 00:48:05,600

energy producing plants and SUVs were on

1067

00:48:09,220 --> 00:48:07,820

the earth there are any SUVs but I bet

1068

00:48:11,760 --> 00:48:09,230

that if you think colberine you talk

1069

00:48:15,250 --> 00:48:11,770

about people's hearts I suppose okay but

1070

00:48:18,850 --> 00:48:15,260

producing the vast amount of energy we

1071

00:48:22,270 --> 00:48:18,860

have today probably 12 11 percent or

1072

00:48:24,190 --> 00:48:22,280

less it's that yeah if that I steam

1073

00:48:26,830 --> 00:48:24,200

engines and gas turbines didn't exist

1074

00:48:30,340 --> 00:48:26,840

then good thing yeah okay did you ever

1075

00:48:33,010 --> 00:48:30,350

hear the little ice age yeah it drove

1076

00:48:35,020 --> 00:48:33,020

the Vikings off of Greenland because

1077

00:48:38,470 --> 00:48:35,030

Greenland a thousand years ago was a

1078

00:48:40,510 --> 00:48:38,480

beautiful green place right and the

1079

00:48:43,690 --> 00:48:40,520

Little Ice Age drove away because it

1080

00:48:45,970 --> 00:48:43,700

froze over the land right in co2 wasn't

1081

00:48:47,980 --> 00:48:45,980

problem back then yeah well I mean the

1082

00:48:50,050 --> 00:48:47,990

issue of global warming in the and the

1083

00:48:51,160 --> 00:48:50,060

role of co2 is has had there's a

1084

00:48:53,140 --> 00:48:51,170

consensus in the scientific community

1085

00:48:55,660 --> 00:48:53,150

that it that it should have and does

1086

00:48:57,310 --> 00:48:55,670

have an effect and the this forum is not

1087

00:48:59,230 --> 00:48:57,320

about the controversy there I know

1088

00:49:00,610 --> 00:48:59,240

they're there to size of this argument I

1089

00:49:03,250 --> 00:49:00,620

have colleagues who are on both on both

1090

00:49:05,020 --> 00:49:03,260

sides as well but based on pure

1091

00:49:07,330 --> 00:49:05,030

thermodynamics and radiative heat

1092

00:49:08,470 --> 00:49:07,340

transfer it's almost impossible for co2

1093

00:49:11,220 --> 00:49:08,480

not to have an effect on the environment

1094

00:49:14,650 --> 00:49:11,230

of the concentrations that is rising two

1095

00:49:17,770 --> 00:49:14,660

okay I can't sit here and without

1096

00:49:21,480 --> 00:49:17,780

speaking about hydrogen how many of you

1097

00:49:25,000 --> 00:49:21,490

in here have fought a hydrogen fire

1098

00:49:27,970 --> 00:49:25,010

nobody but I have when hydrogen burns

1099

00:49:30,520 --> 00:49:27,980

there is no flame that you can see and

1100

00:49:33,490 --> 00:49:30,530

in the hydrogen partner that I thought I

1101

00:49:35,920 --> 00:49:33,500

had to walk up to a valve and put my

1102

00:49:38,890 --> 00:49:35,930

hand across it and got burned to see if

1103

00:49:40,810 --> 00:49:38,900

there was a fire to put out hydrogen is

1104

00:49:43,360 --> 00:49:40,820

one of the most flammable materials

1105

00:49:47,230 --> 00:49:43,370

there is in nature is flammability

1106

00:49:50,230 --> 00:49:47,240

limits in air are 42 seventy-four

1107

00:49:54,010 --> 00:49:50,240

percent so almost any mixture that you

1108

00:49:57,640 --> 00:49:54,020

have of hydrogen in air is a bomb and I

1109

00:50:00,880 --> 00:49:57,650

don't want that in my garage secondly

1110

00:50:04,750 --> 00:50:00,890

the weather it always always talked to

1111

00:50:07,570 --> 00:50:04,760

already talked about that its energy

1112

00:50:10,240 --> 00:50:07,580

wise it's not a good idea because it

1113

00:50:13,510 --> 00:50:10,250

always takes more energy to get the

1114

00:50:15,910 --> 00:50:13,520

hydrogen out then it then you get out of

1115

00:50:17,710 --> 00:50:15,920

it and that you're that all you're only

1116

00:50:21,370 --> 00:50:17,720

going to get a fraction of that energy

1117

00:50:23,350 --> 00:50:21,380

patch right engines and i'm in favor of

1118

00:50:25,150 --> 00:50:23,360

no more burning of anything because

1119

00:50:27,820 --> 00:50:25,160

there are plenty of opportunities to be

1120

00:50:31,840 --> 00:50:27,830

developed and be applied right now today

1121

00:50:35,050 --> 00:50:31,850

and so the hydrogen is is it's just so

1122

00:50:37,540 --> 00:50:35,060

dangerous if there's any other way that

1123

00:50:39,520 --> 00:50:37,550

we can get our energy we don't want to I

1124

00:50:41,710 --> 00:50:39,530

can tell you because I thought hydrogen

1125

00:50:45,160 --> 00:50:41,720

fires I know what it's like I've been

1126

00:50:46,990 --> 00:50:45,170

there and we don't want to do that so

1127

00:50:49,870 --> 00:50:47,000

I'm disappointed in you two guys I was

1128

00:50:57,720 --> 00:50:49,880

expecting you to say that why are we

1129

00:51:06,190 --> 00:51:02,620

I'd like to speak to can go and I'm a

1130

00:51:09,400 --> 00:51:06,200

little nervous folks please forgive me I

1131

00:51:11,710 --> 00:51:09,410

think I think actually everyone is

1132

00:51:14,700 --> 00:51:11,720

missing one real important source of

1133

00:51:19,690 --> 00:51:14,710

energy and that is the human body and

1134

00:51:21,550 --> 00:51:19,700

when you were speaking Ken I'm guided by

1135

00:51:23,410 --> 00:51:21,560

many spirits who work through my

1136

00:51:27,220 --> 00:51:23,420

physical body some of you have lit heard

1137

00:51:30,040 --> 00:51:27,230

them and what I don't usually see things

1138

00:51:32,230 --> 00:51:30,050

though but so this was very unusual so I

1139

00:51:36,280 --> 00:51:32,240

know it was important when you were

1140

00:51:41,650 --> 00:51:36,290

speaking they showed me these two lines

1141

00:51:43,870 --> 00:51:41,660

of zigzag psychedelic lines up here that

1142

00:51:45,070 --> 00:51:43,880

kept distracting me from looking I

1143

00:51:48,330 --> 00:51:45,080

couldn't even look at you for the

1144

00:51:51,370 --> 00:51:48,340

distraction there was a third line also

1145

00:51:54,520 --> 00:51:51,380

it was not exactly with the other two

1146

00:51:55,059 --> 00:51:54,530

and they were kind of they what they

1147

00:51:59,439 --> 00:51:55,069

made me

1148

00:52:02,019 --> 00:51:59,449

enka was a synapse of our brain one

1149

00:52:06,489 --> 00:52:02,029

nerve ending reaching another nerve

1150

00:52:10,689 --> 00:52:06,499

ending and you kind of downplayed bills

1151
00:52:13,569 --> 00:52:10,699
a comment about intention but i think my

1152
00:52:16,199 --> 00:52:13,579
guides want you to you especially to

1153
00:52:19,630 --> 00:52:16,209
think about the possibility of using

1154
00:52:24,549 --> 00:52:19,640
intention along with what you have

1155
00:52:27,759 --> 00:52:24,559
developed that the human brain can help

1156
00:52:29,529 --> 00:52:27,769
it yes very definitely and we are still

1157
00:52:31,539 --> 00:52:29,539
living on the same planet with the same

1158
00:52:33,729 --> 00:52:31,549
physical resources as over a hundred

1159
00:52:36,430 --> 00:52:33,739
years ago with one-tenth population

1160
00:52:38,709 --> 00:52:36,440
which back then only about 1% of the

1161
00:52:41,349 --> 00:52:38,719
population was well off and what is it

1162
00:52:42,819 --> 00:52:41,359
now today about ten percent people live

1163
00:52:45,910 --> 00:52:42,829

are well off that's a hundred times

1164

00:52:47,799 --> 00:52:45,920

increase in the ability to live decently

1165

00:52:49,479 --> 00:52:47,809

on this planet but it's the same planet

1166

00:52:51,370 --> 00:52:49,489

with the same resources and ten times

1167

00:52:53,229 --> 00:52:51,380

the number of people what happened it's

1168

00:52:55,599 --> 00:52:53,239

our ability to live with our environment

1169

00:52:57,699 --> 00:52:55,609

in each other and that's part of what

1170

00:52:59,380 --> 00:52:57,709

you're saying there is that a tremendous

1171

00:53:02,199 --> 00:52:59,390

resource to make this energy work as

1172

00:53:03,670 --> 00:53:02,209

just our own our own social skills that

1173

00:53:08,289 --> 00:53:03,680

can have lots of room for improvement

1174

00:53:10,209 --> 00:53:08,299

yet I i guess my own personal opinion

1175

00:53:13,630 --> 00:53:10,219

after listening to all this well before

1176

00:53:14,949 --> 00:53:13,640

that also is zero-point energy is

1177

00:53:17,079 --> 00:53:14,959

probably the one that's going to be the

1178

00:53:20,729 --> 00:53:17,089

answer to all of the requirements that

1179

00:53:24,309 --> 00:53:20,739

we have so my question is how much

1180

00:53:26,739 --> 00:53:24,319

research is being done and how much is

1181

00:53:29,799 --> 00:53:26,749

required to bring zero-point energy

1182

00:53:34,989 --> 00:53:29,809

online you know it's some whenever that

1183

00:53:37,599 --> 00:53:34,999

might happen and if you let me put it

1184

00:53:42,130 --> 00:53:37,609

this way if you had all the money that

1185

00:53:44,469 --> 00:53:42,140

you could spend how fast could you think

1186

00:53:49,479 --> 00:53:44,479

that we could get the necessary research

1187

00:53:51,219 --> 00:53:49,489

done to utilize zero-point energy limit

1188

00:53:52,180 --> 00:53:51,229

or in comment notice that there are lots

1189

00:53:54,040 --> 00:53:52,190

and lots of rumors

1190

00:53:55,750 --> 00:53:54,050

around on the internet about devices

1191

00:53:57,700 --> 00:53:55,760

that already exists that have zero point

1192

00:54:00,309 --> 00:53:57,710

energy etc etc I don't leave a word of

1193

00:54:02,230 --> 00:54:00,319

that sit tight yes for years and years I

1194

00:54:04,329 --> 00:54:02,240

think all those things are strictly hoax

1195

00:54:05,500 --> 00:54:04,339

and hoaxes and cons and I don't think is

1196

00:54:07,300 --> 00:54:05,510

needed by sitting out there the shelf

1197

00:54:09,040 --> 00:54:07,310

somewhere in this being withheld from us

1198

00:54:10,300 --> 00:54:09,050

by the virtue of the greedy all

1199

00:54:13,720 --> 00:54:10,310

companies or in the government or

1200

00:54:16,089 --> 00:54:13,730

whatever in terms of what it would take

1201
00:54:19,300 --> 00:54:16,099
to demonstrate a zero-point energy can

1202
00:54:21,160 --> 00:54:19,310
be a viable source it's really not that

1203
00:54:23,950 --> 00:54:21,170
much amount of money we're looking

1204
00:54:24,970 --> 00:54:23,960
forward to pursue our patent to carry on

1205
00:54:26,440 --> 00:54:24,980
service here at the University of

1206
00:54:28,990 --> 00:54:26,450
Colorado by the way from the laboratory

1207
00:54:31,569 --> 00:54:29,000
is it's on the order of maybe 10 or 20

1208
00:54:32,650 --> 00:54:31,579
million dollars as we're looking for and

1209
00:54:35,589 --> 00:54:32,660
I think with that amount of money we

1210
00:54:37,540 --> 00:54:35,599
probably pretty definitively either show

1211
00:54:39,900 --> 00:54:37,550
that the effect that we require to make

1212
00:54:43,839 --> 00:54:39,910
this work is real or that is a dead end

1213
00:54:45,720 --> 00:54:43,849

you don't have to say that's absolutely

1214

00:54:49,950 --> 00:54:45,730

nuts

1215

00:54:51,980 --> 00:54:49,960

hot fusion it's his murder how many

1216

00:54:54,420 --> 00:54:51,990

billions of dollars it's more of a

1217

00:54:56,460 --> 00:54:54,430

people problem than is a technology

1218

00:54:59,760 --> 00:54:56,470

problem here's a humorous rule of thumb

1219

00:55:03,720 --> 00:54:59,770

for these sorts of frontier developments

1220

00:55:05,250 --> 00:55:03,730

that a fellow researcher that I know in

1221

00:55:06,720 --> 00:55:05,260

the field brought this up says the

1222

00:55:09,270 --> 00:55:06,730

effort that it takes to get these sort

1223

00:55:12,300 --> 00:55:09,280

of projects to a practical level ten

1224

00:55:14,640 --> 00:55:12,310

percent of the energy of the effort is

1225

00:55:16,290 --> 00:55:14,650

the technology itself twenty percent of

1226
00:55:18,720 --> 00:55:16,300
the effort is overcoming suppression

1227
00:55:20,670 --> 00:55:18,730
interference thirty percent of the

1228
00:55:22,410 --> 00:55:20,680
effort is finding adequate funding in

1229
00:55:24,480 --> 00:55:22,420
the remaining forty percent is just

1230
00:55:28,410 --> 00:55:24,490
interpersonal politics getting people to

1231
00:55:30,240 --> 00:55:28,420
cooperate terms are the words of

1232
00:55:32,210 --> 00:55:30,250
freshmen I don't have any sense of any

1233
00:55:35,700 --> 00:55:32,220
suppression taking place it's simply

1234
00:55:38,480 --> 00:55:35,710
skepticism and subscriptions yep the

1235
00:55:40,920 --> 00:55:38,490
only suppression I know of his just

1236
00:55:42,690 --> 00:55:40,930
maneuvering within industry of somebody

1237
00:55:47,430 --> 00:55:42,700
not wanting competition from somebody

1238
00:55:49,710 --> 00:55:47,440

else there's no indication actually knew

1239

00:55:52,410 --> 00:55:49,720

that is simply ignorance and Prejudice

1240

00:55:57,599 --> 00:55:52,420

because something is new and that their

1241

00:56:00,270 --> 00:55:57,609

children work well well well well

1242

00:56:02,670 --> 00:56:00,280

blabber thank ya thank thank you thank

1243

00:56:04,980 --> 00:56:02,680

you moderator I want to follow up on

1244

00:56:06,630 --> 00:56:04,990

that lady's suggestion about the body

1245

00:56:08,490 --> 00:56:06,640

what came to me and she was saying it

1246

00:56:12,870 --> 00:56:08,500

it's just in a flash never thought of

1247

00:56:14,849 --> 00:56:12,880

this before but uh spoon pending right

1248

00:56:16,980 --> 00:56:14,859

this takes this is something that the

1249

00:56:19,109 --> 00:56:16,990

body presumably is doing in some way and

1250

00:56:21,000 --> 00:56:19,119

it takes incredible and it has anybody

1251
00:56:23,400 --> 00:56:21,010
done a calculation of the energy that it

1252
00:56:25,290 --> 00:56:23,410
takes to bend the spoon has anybody done

1253
00:56:26,970 --> 00:56:25,300
any measurements on transfers of

1254
00:56:29,730 --> 00:56:26,980
energies from the body to the spoon

1255
00:56:31,680 --> 00:56:29,740
during these spoon bending parties it

1256
00:56:33,330 --> 00:56:31,690
wouldn't be very much I mean the amount

1257
00:56:35,880 --> 00:56:33,340
of energy if you can if you can take a

1258
00:56:37,890 --> 00:56:35,890
spoon and bend it with pretty advice and

1259
00:56:40,590 --> 00:56:37,900
putting on let's say 50 pounds of force

1260
00:56:42,120 --> 00:56:40,600
or something like that to bend it okay

1261
00:56:44,130 --> 00:56:42,130
800 pounds but it but if you move if you

1262
00:56:46,410 --> 00:56:44,140
move that through a small angle you know

1263
00:56:47,609 --> 00:56:46,420

integral of torque times the angle gives

1264

00:56:51,350 --> 00:56:47,619

you the work the work could just be in

1265

00:56:54,170 --> 00:56:51,360

the order of jewels yes also just

1266

00:56:57,210 --> 00:56:54,180

it's interesting on a number of fronts

1267

00:56:58,410 --> 00:56:57,220

so according to Jack Howell what he was

1268

00:57:00,420 --> 00:56:58,420

talking about this morning is is you

1269

00:57:02,580 --> 00:57:00,430

sort of essentially greased the grain

1270

00:57:05,160 --> 00:57:02,590

boundaries of the metal which allows the

1271

00:57:07,410 --> 00:57:05,170

the spoon to bend and so there's very

1272

00:57:08,970 --> 00:57:07,420

very little energy involved you're not

1273

00:57:13,260 --> 00:57:08,980

actually bending the spoon in its

1274

00:57:15,780 --> 00:57:13,270

conventional state however to support

1275

00:57:18,090 --> 00:57:15,790

what you're saying you know one of my

1276

00:57:20,100 --> 00:57:18,100

students is working on on on low energy

1277

00:57:22,560 --> 00:57:20,110

nuclear reaction and one of the big

1278

00:57:25,860 --> 00:57:22,570

problems with this is sometimes it

1279

00:57:28,350 --> 00:57:25,870

appears sometimes it doesn't and it just

1280

00:57:31,260 --> 00:57:28,360

fits perfectly into the paradigm of is

1281

00:57:33,030 --> 00:57:31,270

it an intention based phenomenon you

1282

00:57:35,250 --> 00:57:33,040

know I have no evidence that it is I

1283

00:57:40,440 --> 00:57:35,260

cannot say it is but it's certainly an

1284

00:57:41,850 --> 00:57:40,450

interesting question NASA worked on an

1285

00:57:43,980 --> 00:57:41,860

experiment a while back through the

1286

00:57:46,740 --> 00:57:43,990

Space Shuttle that involved a long

1287

00:57:49,620 --> 00:57:46,750

lanyard conductor stretched way out in

1288

00:57:51,450 --> 00:57:49,630

space that produced quite a bit of

1289

00:57:53,280 --> 00:57:51,460

electricity in fact I think it exceeded

1290

00:57:54,630 --> 00:57:53,290

their wildest dreams so much so that it

1291

00:57:57,450 --> 00:57:54,640

conducted current and I think it broke

1292

00:57:59,580 --> 00:57:57,460

the cable there's new materials being

1293

00:58:04,020 --> 00:57:59,590

generated now talk of a space elevator

1294

00:58:07,050 --> 00:58:04,030

carbon fiber tubules and so on the earth

1295

00:58:08,910 --> 00:58:07,060

turning through a magnetic field with

1296

00:58:11,100 --> 00:58:08,920

the conductor generates lots of

1297

00:58:13,830 --> 00:58:11,110

electricity is that not cannot beat not

1298

00:58:16,320 --> 00:58:13,840

be scaled up to be something practical

1299

00:58:17,970 --> 00:58:16,330

yes we can but we don't know what the

1300

00:58:19,740 --> 00:58:17,980

side effects are from disturbing the

1301

00:58:23,070 --> 00:58:19,750

ionosphere by tapping that much

1302

00:58:24,900 --> 00:58:23,080

electricity out of it we don't know that

1303

00:58:26,670 --> 00:58:24,910

the side effects it's already put a

1304

00:58:29,100 --> 00:58:26,680

damper on it but I'm just cautious of

1305

00:58:36,450 --> 00:58:29,110

where is this energy coming from and

1306

00:58:38,640 --> 00:58:36,460

what's it doing oh yes tapping lightning

1307

00:58:43,440 --> 00:58:38,650

is a very dangerous thing it's how do

1308

00:58:45,270 --> 00:58:43,450

you limit it it's getting a tiger by the

1309

00:58:46,530 --> 00:58:45,280

tail for sure well well the world is

1310

00:58:48,900 --> 00:58:46,540

full of energy if you look at the amount

1311

00:58:51,450 --> 00:58:48,910

of solar radiation pinching on the

1312

00:58:53,730 --> 00:58:51,460

planet continuously it's enough to power

1313

00:58:55,230 --> 00:58:53,740

civilization a thousand times over but

1314

00:58:58,020 --> 00:58:55,240

it's not high grade energy when it's

1315

00:58:59,790 --> 00:58:58,030

just blowing in as low breezes or in

1316

00:59:02,190 --> 00:58:59,800

and mildly warm water on the surface of

1317

00:59:03,570 --> 00:59:02,200

the ocean it's it's low grade and you

1318

00:59:05,610 --> 00:59:03,580

have to have apparatus to extract it

1319

00:59:07,380 --> 00:59:05,620

from so it's not a question of whether

1320

00:59:09,810 --> 00:59:07,390

they're free energy sources it also is a

1321

00:59:12,600 --> 00:59:09,820

matter of of conversion the apparatus

1322

00:59:13,590 --> 00:59:12,610

necessary for that transport storage all

1323

00:59:16,710 --> 00:59:13,600

of these things all that infrastructure

1324

00:59:18,600 --> 00:59:16,720

and so you can't simply just talk about

1325

00:59:21,240 --> 00:59:18,610

where the energy is it's a question of

1326

00:59:23,040 --> 00:59:21,250

is it is that ubiquitous is a portables

1327

00:59:24,870 --> 00:59:23,050

at high energy density is a cheap is it

1328

00:59:28,020 --> 00:59:24,880

green all of these things become are

1329

00:59:30,120 --> 00:59:28,030

important here and and what what would

1330

00:59:32,460 --> 00:59:30,130

Garrett and Bernie are proposing and

1331

00:59:33,720 --> 00:59:32,470

Kenner are possibilities where these

1332

00:59:35,370 --> 00:59:33,730

things would be in principle could be

1333

00:59:37,140 --> 00:59:35,380

portable devices the size of this bottle

1334

00:59:38,400 --> 00:59:37,150

and something this size would would be

1335

00:59:41,760 --> 00:59:38,410

at the center of your household running

1336

00:59:43,020 --> 00:59:41,770

it ad infinitum that would that's the

1337

00:59:44,610 --> 00:59:43,030

kind of radical change we're talking

1338

00:59:46,950 --> 00:59:44,620

about get rid of the infrastructure you

1339

00:59:48,720 --> 00:59:46,960

know you could scrap the the electrical

1340

00:59:50,640 --> 00:59:48,730

grids in the United States put away all

1341

00:59:53,280 --> 00:59:50,650

the all the power plants bury them very

1342

00:59:55,770 --> 00:59:53,290

the nuclear power plants it would you

1343

00:59:58,140 --> 00:59:55,780

get rid of all the oil tankers no more

1344

00:59:59,610 --> 00:59:58,150

railroads from coal mines shut down the

1345

01:00:01,500 --> 00:59:59,620

coal mines shut down the oil fields

1346

01:00:03,300 --> 01:00:01,510

everything all this stuff would change

1347

01:00:04,620 --> 01:00:03,310

it would be a radical change and what

1348

01:00:06,450 --> 01:00:04,630

I'm really interested in is hearing your

1349

01:00:08,100 --> 01:00:06,460

ideas about how radical this would be

1350

01:00:12,810 --> 01:00:08,110

and whether it would actually be a good

1351

01:00:14,880 --> 01:00:12,820

thing my argument it basically is this

1352

01:00:17,010 --> 01:00:14,890

now in the paper that in the jse

1353

01:00:18,750 --> 01:00:17,020

ultimately I think it is a bad thing and

1354

01:00:20,520 --> 01:00:18,760

reason is because if you have

1355

01:00:22,560 --> 01:00:20,530

unlimited energy that will allow you to

1356

01:00:24,690 --> 01:00:22,570

pillage the planet that much more

1357

01:00:26,400 --> 01:00:24,700

quickly you could you could make you can

1358

01:00:27,720 --> 01:00:26,410

make fishing trawlers which never have

1359

01:00:30,120 --> 01:00:27,730

to come into port until they were full

1360

01:00:32,220 --> 01:00:30,130

you could you could build undoing

1361

01:00:33,420 --> 01:00:32,230

machines to cut down entire swathes the

1362

01:00:35,340 --> 01:00:33,430

forest without ever having to repower

1363

01:00:37,740 --> 01:00:35,350

them you could build engines of war that

1364

01:00:40,020 --> 01:00:37,750

never needed to be refueled no no fewer

1365

01:00:41,910 --> 01:00:40,030

lines having to go out I'm your creative

1366

01:00:44,250 --> 01:00:41,920

anti-gravity for precisely that reason

1367

01:00:46,230 --> 01:00:44,260

well you could you could go on mining

1368

01:00:48,510 --> 01:00:46,240

for as much as you want all the oars so

1369

01:00:51,060 --> 01:00:48,520

I mean ultimately it's a matter of our

1370

01:00:52,350 --> 01:00:51,070

human nature if we had unlimited amounts

1371

01:00:53,910 --> 01:00:52,360

of energy what would we do with it I'm

1372

01:01:01,320 --> 01:00:53,920

not sure it would necessarily be a good

1373

01:01:02,580 --> 01:01:01,330

thing that's quite interesting I I was

1374

01:01:06,240 --> 01:01:02,590

kind of comment on something a little

1375

01:01:08,340 --> 01:01:06,250

earlier about how well uh how well off

1376

01:01:09,840 --> 01:01:08,350

we are and I agree that we are better

1377

01:01:13,740 --> 01:01:09,850

off now than

1378

01:01:16,320 --> 01:01:13,750

we have been for centuries but I I see

1379

01:01:18,480 --> 01:01:16,330

that we're not necessarily going to

1380

01:01:22,320 --> 01:01:18,490

continue this way right now we're kind

1381

01:01:26,820 --> 01:01:22,330

of reaching a point where my kids are

1382

01:01:29,370 --> 01:01:26,830

projected to live less years than I am

1383

01:01:31,880 --> 01:01:29,380

you know we've just kind of Crested now

1384

01:01:34,080 --> 01:01:31,890

or stresses up this for sure yeah and

1385

01:01:36,810 --> 01:01:34,090

facility to destroy ourselves has

1386

01:01:38,010 --> 01:01:36,820

accelerated tremendously absolutely

1387

01:01:39,630 --> 01:01:38,020

we've had the ability to destroy

1388

01:01:41,790 --> 01:01:39,640

ourselves for quite some time now and

1389

01:01:46,800 --> 01:01:41,800

it's fortunate we didn't do that in the

1390

01:01:47,940 --> 01:01:46,810

80s with the Russians and all but and is

1391

01:01:50,970 --> 01:01:47,950

it do you think it's better that we're

1392

01:01:53,100 --> 01:01:50,980

limited by the the dearth of natural

1393

01:01:55,770 --> 01:01:53,110

resources well I think the

1394

01:01:58,950 --> 01:01:55,780

infrastructure that's that's in power

1395

01:02:05,670 --> 01:01:58,960

now would definitely be opposed to any

1396

01:02:09,300 --> 01:02:05,680

type of free energy if if the nation's

1397

01:02:13,430 --> 01:02:09,310

the west wall to do nations had free

1398

01:02:16,080 --> 01:02:13,440

energy and they weren't dependent on us

1399

01:02:18,780 --> 01:02:16,090

that would really shift about the

1400

01:02:21,360 --> 01:02:18,790

balance of power considerably yes mom

1401

01:02:25,950 --> 01:02:21,370

and I agree with your concerns about it

1402

01:02:29,850 --> 01:02:25,960

being abused and and the power

1403

01:02:33,900 --> 01:02:29,860

infrastructure you know oil I mean these

1404

01:02:36,060 --> 01:02:33,910

are big players in our economy imagine

1405

01:02:37,590 --> 01:02:36,070

what what would happen to our finances

1406

01:02:40,950 --> 01:02:37,600

if all of a sudden we didn't have to pay

1407

01:02:42,540 --> 01:02:40,960

for the power bill well it's not just

1408

01:02:44,970 --> 01:02:42,550

the power bills everything you every

1409

01:02:48,570 --> 01:02:44,980

single product you own has has energy

1410

01:02:52,260 --> 01:02:48,580

costs behind it right I mean China could

1411

01:02:54,930 --> 01:02:52,270

produce just tons of stuff you know even

1412

01:02:57,840 --> 01:02:54,940

more cheaply if they didn't have the

1413

01:02:59,490 --> 01:02:57,850

energy requirements so how many of you

1414

01:03:01,020 --> 01:02:59,500

think that we shouldn't actually we

1415

01:03:19,080 --> 01:03:01,030

should not actually develop a free

1416

01:03:24,880 --> 01:03:23,140

resources but we know that some

1417

01:03:28,510 --> 01:03:24,890

societies choose now to invent certain

1418

01:03:30,120 --> 01:03:28,520

things society doesn't just follow this

1419

01:03:32,890 --> 01:03:30,130

course and it's not necessarily

1420

01:03:36,580 --> 01:03:32,900

predetermined based on what is best and

1421

01:03:37,870 --> 01:03:36,590

what is most powerful um somebody said

1422

01:03:39,580 --> 01:03:37,880

that well maybe that there are

1423

01:03:41,340 --> 01:03:39,590

mechanisms like all industries I would

1424

01:03:43,630 --> 01:03:41,350

you know hole will hold us down from

1425

01:03:47,400 --> 01:03:43,640

developing something like this and maybe

1426

01:03:50,020 --> 01:03:47,410

that's not realistic maybe it is but

1427

01:03:52,180 --> 01:03:50,030

maybe there are just mechanisms built

1428

01:03:55,660 --> 01:03:52,190

into any system that forms societies

1429

01:03:57,520 --> 01:03:55,670

that prevent it from developing mostly

1430

01:04:00,040 --> 01:03:57,530

powerful technologies i can destroy it

1431

01:04:01,750 --> 01:04:00,050

like biotechnology if it becomes

1432

01:04:04,210 --> 01:04:01,760

ubiquitous then you can have hackers

1433

01:04:06,310 --> 01:04:04,220

that would make viruses that could kill

1434

01:04:07,900 --> 01:04:06,320

everybody right so maybe there's a

1435

01:04:12,480 --> 01:04:07,910

similar I don't know if that's realistic

1436

01:04:14,410 --> 01:04:12,490

or not but yes I've got one over here

1437

01:04:15,790 --> 01:04:14,420

maybe we'll put up maybe we'll put the

1438

01:04:24,849 --> 01:04:15,800

microphone on the stand let people line

1439

01:04:29,500 --> 01:04:24,859

up sounds good and that look up doll me

1440

01:04:33,700 --> 01:04:29,510

extraneous comments I've heard a lot of

1441

01:04:35,500 --> 01:04:33,710

talk about the cost of energy and I just

1442

01:04:37,660 --> 01:04:35,510

want to remind everybody that money is

1443

01:04:39,700 --> 01:04:37,670

fake we invented the financial system

1444

01:04:42,640 --> 01:04:39,710

the monetary system will live in is a

1445

01:04:45,040 --> 01:04:42,650

construct that regulates our environment

1446

01:04:47,140 --> 01:04:45,050

that we currently reside in um another

1447

01:04:48,940 --> 01:04:47,150

interesting thing that i think i should

1448

01:04:52,180 --> 01:04:48,950

mention is known as talked about Nikola

1449

01:04:54,849 --> 01:04:52,190

Tesla at all and Wardencliffe tower and

1450

01:04:57,070 --> 01:04:54,859

tapping Liana's you inherited it so we

1451

01:04:58,960 --> 01:04:57,080

can get there so I couldn't learn yet

1452

01:05:00,820 --> 01:04:58,970

guys his thoughts on Nikola Tesla and

1453

01:05:02,470 --> 01:05:00,830

his technology the fact that the

1454

01:05:04,750 --> 01:05:02,480

monetary system brought his technology

1455

01:05:07,960 --> 01:05:04,760

to a halt because they couldn't put a

1456

01:05:10,660 --> 01:05:07,970

meter on money that would own energy

1457

01:05:13,930 --> 01:05:10,670

that was free so really the question is

1458

01:05:15,580 --> 01:05:13,940

immune are we going to idea over the

1459

01:05:17,260 --> 01:05:15,590

cost of doing this or we're going to go

1460

01:05:19,750 --> 01:05:17,270

extinct because free energy is

1461

01:05:21,550 --> 01:05:19,760

inevitable if we don't extent the world

1462

01:05:23,440 --> 01:05:21,560

is going to work perfectly the Sun is

1463

01:05:25,690 --> 01:05:23,450

going to function perfectly that's 4G

1464

01:05:28,750 --> 01:05:25,700

part of the Tesla mystique is also

1465

01:05:29,930 --> 01:05:28,760

steeped in the wannabe hype that's so

1466

01:05:31,730 --> 01:05:29,940

prevalent on the inner

1467

01:05:35,240 --> 01:05:31,740

but there is some truth behind that

1468

01:05:39,440 --> 01:05:35,250

we're still sorting out what that genius

1469

01:05:41,930 --> 01:05:39,450

did and what he didn't do just as a

1470

01:05:43,940 --> 01:05:41,940

thought to go somewhere with it I have a

1471

01:05:45,920 --> 01:05:43,950

fellow researcher in western Washington

1472

01:05:48,079 --> 01:05:45,930

the two of us have figured out how to

1473

01:05:50,480 --> 01:05:48,089

generate Paul lightning on demand which

1474

01:05:53,630 --> 01:05:50,490

is a thing that previously had only been

1475

01:05:55,339 --> 01:05:53,640

attributed to him and we can do that now

1476

01:05:57,050 --> 01:05:55,349

we don't see it as a source of energy

1477

01:06:02,150 --> 01:05:57,060

but we see more it as a medium for

1478

01:06:04,790 --> 01:06:02,160

processing things right I had a comment

1479

01:06:07,809 --> 01:06:04,800

related to what Bernie had said that he

1480

01:06:10,040 --> 01:06:07,819

was not aware of any suppression of

1481

01:06:12,170 --> 01:06:10,050

inventions and a lot of you know there's

1482

01:06:13,970 --> 01:06:12,180

a lot of conspiracy theories about that

1483

01:06:17,030 --> 01:06:13,980

and all but that the fact of the matter

1484

01:06:18,370 --> 01:06:17,040

is is that it is well documented the

1485

01:06:21,260 --> 01:06:18,380

government the United States government

1486

01:06:26,270 --> 01:06:21,270

itself provides the information that

1487

01:06:28,040 --> 01:06:26,280

certain inventions are suppressed not in

1488

01:06:31,460 --> 01:06:28,050

not in terms of what we conventionally

1489

01:06:35,240 --> 01:06:31,470

think of but in terms of secrecy orders

1490

01:06:36,980 --> 01:06:35,250

I sent away a few years ago to get

1491

01:06:40,460 --> 01:06:36,990

through the Freedom of Information Act

1492

01:06:43,849 --> 01:06:40,470

to the Patent Office and asked for a

1493

01:06:46,099 --> 01:06:43,859

listing of all of the just statistics

1494

01:06:47,839 --> 01:06:46,109

because they won't release the names of

1495

01:06:49,910 --> 01:06:47,849

the patents but I asked for the

1496

01:06:52,970 --> 01:06:49,920

statistics in which they had issued

1497

01:06:55,220 --> 01:06:52,980

secrecy orders and if you have ever seen

1498

01:06:58,730 --> 01:06:55,230

a secrecy order it disallows the

1499

01:07:01,430 --> 01:06:58,740

inventor to even talk publish or say

1500

01:07:03,670 --> 01:07:01,440

anything about the invention that has

1501

01:07:06,680 --> 01:07:03,680

the secrecy order because it's a legal

1502

01:07:08,690 --> 01:07:06,690

enforceable document by the executive

1503

01:07:10,550 --> 01:07:08,700

department you know that that they

1504

01:07:13,400 --> 01:07:10,560

cannot talk about it or anything but

1505

01:07:15,460 --> 01:07:13,410

their statistics were at that time just

1506

01:07:19,790 --> 01:07:15,470

a few years ago that there were

1507

01:07:23,809 --> 01:07:19,800

approximately 6,000 secrecy orders well

1508

01:07:27,230 --> 01:07:23,819

on 6000 inventions which nobody could

1509

01:07:29,150 --> 01:07:27,240

find anything out about and which the

1510

01:07:32,210 --> 01:07:29,160

inventors could not talk about or

1511

01:07:34,430 --> 01:07:32,220

publish about so if you're interested in

1512

01:07:37,160 --> 01:07:34,440

I mean the question of suppression I

1513

01:07:39,020 --> 01:07:37,170

mean it was it's it's done under the

1514

01:07:40,339 --> 01:07:39,030

guise of you know it to protect the

1515

01:07:41,960 --> 01:07:40,349

national security of the United States

1516

01:07:43,780 --> 01:07:41,970

which i think is important because you

1517

01:07:46,150 --> 01:07:43,790

wouldn't want people to invent a

1518

01:07:48,160 --> 01:07:46,160

a gun obviously that that you know

1519

01:07:50,050 --> 01:07:48,170

perhaps as a poor gun or something could

1520

01:07:52,300 --> 01:07:50,060

people be running around killing people

1521

01:07:54,940 --> 01:07:52,310

or whatever but the fact of the matter

1522

01:07:57,910 --> 01:07:54,950

is that there are at least 6,000

1523

01:08:00,580 --> 01:07:57,920

inventions that the that the Patent

1524

01:08:02,860 --> 01:08:00,590

Office has already established the

1525

01:08:04,750 --> 01:08:02,870

secrecy orders on and since nineteen

1526

01:08:07,600 --> 01:08:04,760

forty-two because they sent me the the

1527

01:08:09,340 --> 01:08:07,610

thought it was 47 that the National

1528

01:08:11,230 --> 01:08:09,350

Security Act came through well it may

1529

01:08:13,420 --> 01:08:11,240

have been they had secrecy orders even

1530

01:08:15,970 --> 01:08:13,430

before 1947 okay but I think there's a

1531

01:08:17,380 --> 01:08:15,980

difference here and let me finish we're

1532

01:08:20,740 --> 01:08:17,390

going to finish rather than being

1533

01:08:23,800 --> 01:08:20,750

interrupted the since nineteen forty-two

1534

01:08:26,500 --> 01:08:23,810

there had been over 10,000 secrecy

1535

01:08:29,200 --> 01:08:26,510

orders established but they do lift them

1536

01:08:30,520 --> 01:08:29,210

after certain periods of time but in any

1537

01:08:32,140 --> 01:08:30,530

case I just want to make it clear that

1538

01:08:33,700 --> 01:08:32,150

there have been secrets yours and there

1539

01:08:37,210 --> 01:08:33,710

are thousands of inventions out there

1540

01:08:39,130 --> 01:08:37,220

that nobody knows about and obviously

1541

01:08:42,430 --> 01:08:39,140

you know some of those I could include

1542

01:08:43,990 --> 01:08:42,440

advanced technologies that that you for

1543

01:08:45,370 --> 01:08:44,000

folks have been doing research on that

1544

01:08:47,890 --> 01:08:45,380

you wouldn't know about because the

1545

01:08:49,570 --> 01:08:47,900

inventor can't talk about it okay no

1546

01:08:51,760 --> 01:08:49,580

sure well that lepers experience all

1547

01:08:53,950 --> 01:08:51,770

yeah certainly this crossed my mind a

1548

01:08:55,210 --> 01:08:53,960

bit when when we were applying for the

1549

01:08:56,829 --> 01:08:55,220

patent on the zero-point energy device

1550

01:08:58,240 --> 01:08:56,839

about well you know maybe there's some

1551

01:09:01,270 --> 01:08:58,250

chance this will happen i hate the cs

1552

01:09:04,120 --> 01:09:01,280

secrecy order put over us but in fact

1553

01:09:06,480 --> 01:09:04,130

nothing whatsoever I never ever crossed

1554

01:09:09,400 --> 01:09:06,490

my radar screen but there was not any

1555

01:09:11,590 --> 01:09:09,410

possibility that's happening and it

1556

01:09:14,500 --> 01:09:11,600

didn't and that proves you the one or

1557

01:09:15,970 --> 01:09:14,510

two things either that they don't do

1558

01:09:17,500 --> 01:09:15,980

these secrecy things very often and out

1559

01:09:18,789 --> 01:09:17,510

in this area or they've got this so

1560

01:09:21,250 --> 01:09:18,799

wrong you know it's not gonna work they

1561

01:09:23,289 --> 01:09:21,260

don't care well well that's a

1562

01:09:25,900 --> 01:09:23,299

possibility Bernie but maybe it wasn't

1563

01:09:28,120 --> 01:09:25,910

it you know dangerous enough that would

1564

01:09:29,860 --> 01:09:28,130

that would threaten the security the

1565

01:09:31,510 --> 01:09:29,870

United States and some fashion but there

1566

01:09:34,809 --> 01:09:31,520

are at least six hours now because I I

1567

01:09:36,190 --> 01:09:34,819

checked just maybe a few months ago as

1568

01:09:38,620 --> 01:09:36,200

well and there still is about the same

1569

01:09:41,440 --> 01:09:38,630

numbers or what well I don't think it's

1570

01:09:43,300 --> 01:09:41,450

going to apply our policy for most of us

1571

01:09:44,200 --> 01:09:43,310

i think is to publish these results once

1572

01:09:46,780 --> 01:09:44,210

they go out into the open literature

1573

01:09:48,130 --> 01:09:46,790

they can't be suppressed and and they're

1574

01:09:49,750 --> 01:09:48,140

they're not going to gag academics

1575

01:09:51,700 --> 01:09:49,760

because that's not going to happen right

1576

01:09:53,410 --> 01:09:51,710

well that's what i've said you know to

1577

01:09:54,560 --> 01:09:53,420

keep you from being suppressed just

1578

01:09:56,270 --> 01:09:54,570

publish it on the Internet

1579

01:09:57,319 --> 01:09:56,280

there better ways of suppressing in the

1580

01:09:58,669 --> 01:09:57,329

old days they used to burn you at the

1581

01:10:06,620 --> 01:09:58,679

stake for heresy now they just don't

1582

01:10:09,680 --> 01:10:06,630

fund you and then from the science

1583

01:10:11,959 --> 01:10:09,690

fiction world there are two Robert

1584

01:10:13,129 --> 01:10:11,969

Heinlein stories and I'm only going to

1585

01:10:17,390 --> 01:10:13,139

be able to remember the name of one of

1586

01:10:19,459 --> 01:10:17,400

them what happens if a simple energy

1587

01:10:26,569 --> 01:10:19,469

source is invented and one was called

1588

01:10:29,450 --> 01:10:26,579

brown shoe where the hippie living was

1589

01:10:32,089 --> 01:10:29,460

girlfriend figures it out and he has to

1590

01:10:34,729 --> 01:10:32,099

on then spend ten years going back and

1591

01:10:36,410 --> 01:10:34,739

getting a PhD and becoming part of his

1592

01:10:40,459 --> 01:10:36,420

father's company and wearing suits and

1593

01:10:42,290 --> 01:10:40,469

ties and slowly injecting this into

1594

01:10:45,439 --> 01:10:42,300

society until it can't be stopped

1595

01:10:47,689 --> 01:10:45,449

because he realized that um reputation

1596

01:10:50,410 --> 01:10:47,699

is everything for for alternative

1597

01:10:52,669 --> 01:10:50,420

science that it would be easily stopped

1598

01:10:56,450 --> 01:10:52,679

anything you could think of to do it it

1599

01:10:59,500 --> 01:10:56,460

would be easily stopped except to have

1600

01:11:02,859 --> 01:10:59,510

it be a slow business development so

1601
01:11:06,800 --> 01:11:02,869
just just not suppression but just um

1602
01:11:08,629 --> 01:11:06,810
disbelief and Prejudice it's probably a

1603
01:11:11,990 --> 01:11:08,639
much bigger bigger than we think even if

1604
01:11:13,700 --> 01:11:12,000
we have something to sell you can then

1605
01:11:15,530 --> 01:11:13,710
be jailed because everybody knows it

1606
01:11:21,530 --> 01:11:15,540
doesn't exist and you're running a scam

1607
01:11:24,589 --> 01:11:21,540
like de Forest was almost jailed for

1608
01:11:29,569 --> 01:11:24,599
pretending that the the diode vacuum

1609
01:11:32,740 --> 01:11:29,579
tube could be part of a radio but that

1610
01:11:38,540 --> 01:11:32,750
was one hyman story another one was a

1611
01:11:41,149 --> 01:11:38,550
space opera type where a worship that

1612
01:11:44,089 --> 01:11:41,159
had gone out to the planets to dig

1613
01:11:46,760 --> 01:11:44,099

uranium came back 50 years later and all

1614

01:11:49,490 --> 01:11:46,770

the cities were abandoned and that was

1615

01:11:52,189 --> 01:11:49,500

because a little electromagnetic device

1616

01:11:55,100 --> 01:11:52,199

was discovered that you could run your

1617

01:11:57,979 --> 01:11:55,110

your farm implements by building this

1618

01:12:03,169 --> 01:11:57,989

thing with several coils so after all of

1619

01:12:04,640 --> 01:12:03,179

the changing the economy died down it

1620

01:12:06,959 --> 01:12:04,650

was all turning communities no big

1621

01:12:10,529 --> 01:12:06,969

cities so that was his his

1622

01:12:14,700 --> 01:12:10,539

of what energy device would do to

1623

01:12:19,049 --> 01:12:14,710

society I'll just quickly one third one

1624

01:12:21,870 --> 01:12:19,059

is that I know of is the bomb on and the

1625

01:12:25,310 --> 01:12:21,880

method nita society community in

1626

01:12:28,080 --> 01:12:25,320

Switzerland I think it is yes that he

1627

01:12:29,969 --> 01:12:28,090

apparently has a device could be a hopes

1628

01:12:31,350 --> 01:12:29,979

you know it could be maybe has something

1629

01:12:33,149 --> 01:12:31,360

he doesn't know how it works or maybe

1630

01:12:36,270 --> 01:12:33,159

it's exactly what he thinks that he

1631

01:12:37,680 --> 01:12:36,280

won't let anybody else find out about it

1632

01:12:40,259 --> 01:12:37,690

because he's convinced that it would

1633

01:12:42,270 --> 01:12:40,269

take down civilization they think the

1634

01:12:44,239 --> 01:12:42,280

world is not ready for it right it's

1635

01:12:46,739 --> 01:12:44,249

actually a religious community that

1636

01:12:48,299 --> 01:12:46,749

they're keeping it to themselves or they

1637

01:12:50,399 --> 01:12:48,309

think that if they release it that that

1638

01:12:54,660 --> 01:12:50,409

the the mass death that the changes

1639

01:12:58,890 --> 01:12:54,670

would cause is too much to have on their

1640

01:13:01,500 --> 01:12:58,900

conscience but the front bomb their

1641

01:13:03,330 --> 01:13:01,510

research about such devices going on but

1642

01:13:06,049 --> 01:13:03,340

to my knowledge none of them have been

1643

01:13:09,839 --> 01:13:06,059

completely successful to any

1644

01:13:12,750 --> 01:13:09,849

demonstrable or alive are repeatable

1645

01:13:15,600 --> 01:13:12,760

extent all right if it was then we don't

1646

01:13:18,180 --> 01:13:15,610

rehab them of course I mean if it was

1647

01:13:20,910 --> 01:13:18,190

real well cold fusion is real but it

1648

01:13:22,709 --> 01:13:20,920

lacks the of the financial backing that

1649

01:13:25,709 --> 01:13:22,719

needs to develop it to get out to

1650

01:13:32,850 --> 01:13:25,719

commercial levels yeah oh you're only

1651

01:13:36,029 --> 01:13:32,860

partly right but not completely well I'm

1652

01:13:38,129 --> 01:13:36,039

I want to go back to what dan brought up

1653

01:13:39,569 --> 01:13:38,139

that the question of and appreciate that

1654

01:13:42,180 --> 01:13:39,579

we know we do need to ask this question

1655

01:13:46,589 --> 01:13:42,190

of why are we developing greater and

1656

01:13:48,569 --> 01:13:46,599

greater energy sources and i do i think

1657

01:13:51,049 --> 01:13:48,579

i agree with you Dan that if we do that

1658

01:13:53,879 --> 01:13:51,059

it would create many problems such as

1659

01:13:55,469 --> 01:13:53,889

not having any scarcity you know we

1660

01:13:58,609 --> 01:13:55,479

would not have any consequences for our

1661

01:14:01,890 --> 01:13:58,619

actions and it could be like you said

1662

01:14:03,180 --> 01:14:01,900

sort of catastrophic or dangerous given

1663

01:14:06,000 --> 01:14:03,190

the human condition as it currently

1664

01:14:07,469 --> 01:14:06,010

stands so I think the most important

1665

01:14:09,839 --> 01:14:07,479

thing even more important in finding

1666

01:14:11,009 --> 01:14:09,849

more energy is to change the human

1667

01:14:12,569 --> 01:14:11,019

consciousness or the state of our

1668

01:14:14,459 --> 01:14:12,579

society so that we could deal with that

1669

01:14:16,469 --> 01:14:14,469

energy because with greater energy comes

1670

01:14:17,740 --> 01:14:16,479

greater power and you know we don't

1671

01:14:20,470 --> 01:14:17,750

necessarily have the

1672

01:14:23,770 --> 01:14:20,480

to deal with that power at this point so

1673

01:14:26,350 --> 01:14:23,780

I for I think both teams of research

1674

01:14:29,680 --> 01:14:26,360

going on you know looking at the model

1675

01:14:31,690 --> 01:14:29,690

of Einstein suggesting to President

1676

01:14:35,710 --> 01:14:31,700

Roosevelt about looking into nuclear

1677

01:14:37,510 --> 01:14:35,720

bombs in World War two with no intention

1678

01:14:39,880 --> 01:14:37,520

of that starting a nuclear arms race how

1679

01:14:41,350 --> 01:14:39,890

do we as physicists take responsibility

1680

01:14:43,270 --> 01:14:41,360

for the fact that especially in our

1681

01:14:46,780 --> 01:14:43,280

current world when we do invent an

1682

01:14:48,370 --> 01:14:46,790

important discovery the first people

1683

01:14:51,610 --> 01:14:48,380

interested in it are probably the US

1684

01:14:53,290 --> 01:14:51,620

government for military purposes and how

1685

01:14:54,640 --> 01:14:53,300

do we deal with you know the fact that

1686

01:14:56,770 --> 01:14:54,650

we also take some responsibility for

1687

01:14:58,030 --> 01:14:56,780

that and there's no one controlling the

1688

01:15:00,010 --> 01:14:58,040

use of these things some of these new

1689

01:15:02,410 --> 01:15:00,020

energies will be benign and what I've

1690

01:15:05,230 --> 01:15:02,420

been talking about in in Daniel 2 is

1691

01:15:08,530 --> 01:15:05,240

very difficult to imagine it being

1692

01:15:10,720 --> 01:15:08,540

weaponized ball though it can be useful

1693

01:15:12,730 --> 01:15:10,730

very useful practical somewhat good

1694

01:15:14,560 --> 01:15:12,740

concentration energy levels it's not

1695

01:15:16,720 --> 01:15:14,570

high enough to for the military to take

1696

01:15:18,460 --> 01:15:16,730

interest in it I'm not sure sir you

1697

01:15:21,400 --> 01:15:18,470

could probably make warships and

1698

01:15:23,740 --> 01:15:21,410

submarines which which could use

1699

01:15:26,050 --> 01:15:23,750

seawater and and basically have high

1700

01:15:28,210 --> 01:15:26,060

power density motors and cipher ghazal

1701

01:15:32,080 --> 01:15:28,220

nanotechnology is much more dense and

1702

01:15:33,760 --> 01:15:32,090

that census right but your points

1703

01:15:35,170 --> 01:15:33,770

well-taken I don't know whether we

1704

01:15:36,580 --> 01:15:35,180

should or not I mean I've considered

1705

01:15:38,500 --> 01:15:36,590

abandoning my research for this reason

1706

01:15:40,720 --> 01:15:38,510

but in the but in the short term I think

1707

01:15:42,580 --> 01:15:40,730

the energy deliver were in and the and

1708

01:15:45,430 --> 01:15:42,590

the environmental damage we're doing to

1709

01:15:46,840 --> 01:15:45,440

the world especially wiping out roughly

1710

01:15:48,310 --> 01:15:46,850

half the species within the next hundred

1711

01:15:52,150 --> 01:15:48,320

years which is which would make us a

1712

01:15:53,560 --> 01:15:52,160

mass extinguisher of life I think is the

1713

01:15:55,330 --> 01:15:53,570

greatest crime there is and I think in

1714

01:15:57,910 --> 01:15:55,340

the short term a new energy source is

1715

01:15:59,830 --> 01:15:57,920

almost essential to forestall this or

1716

01:16:01,410 --> 01:15:59,840

eliminate the possibility but in the

1717

01:16:04,090 --> 01:16:01,420

longer term is what I'm worried about

1718

01:16:05,320 --> 01:16:04,100

and so I've teetered about whether I

1719

01:16:09,190 --> 01:16:05,330

should walk away from this or not but

1720

01:16:11,080 --> 01:16:09,200

I'm not going to and one other safeguard

1721

01:16:12,520 --> 01:16:11,090

to some extent is when several of us

1722

01:16:15,490 --> 01:16:12,530

have said

1723

01:16:18,490 --> 01:16:15,500

Daniel that we need to just publish our

1724

01:16:19,930 --> 01:16:18,500

results because if we put it out to

1725

01:16:23,050 --> 01:16:19,940

everybody in sort of a level playing

1726

01:16:27,070 --> 01:16:23,060

field and at that point we can hope that

1727

01:16:29,140 --> 01:16:27,080

the good outweighs the bad I'm intrigued

1728

01:16:34,140 --> 01:16:29,150

by what Daniel said when you said just

1729

01:16:38,100 --> 01:16:34,150

about the negative consequences of

1730

01:16:40,960 --> 01:16:38,110

ubiquitous energy not in too much and I

1731

01:16:42,580 --> 01:16:40,970

imagined that there are two stages with

1732

01:16:44,980 --> 01:16:42,590

this as there are with many things and

1733

01:16:46,000 --> 01:16:44,990

that is as you develop more of it well

1734

01:16:48,280 --> 01:16:46,010

the first thing that's going to happen

1735

01:16:49,780 --> 01:16:48,290

is everybody's going to get an SUV and

1736

01:16:53,650 --> 01:16:49,790

my little car I won't be able to see out

1737

01:16:56,440 --> 01:16:53,660

it's always sad and then people will do

1738

01:16:58,450 --> 01:16:56,450

what Daniel said and you know will rape

1739

01:17:02,100 --> 01:16:58,460

the oceans and do various other things

1740

01:17:04,510 --> 01:17:02,110

but that's sort of a scarcity mentality

1741

01:17:07,480 --> 01:17:04,520

finally when we moved beyond that

1742

01:17:09,910 --> 01:17:07,490

scarcity mentality that's when we can

1743

01:17:12,640 --> 01:17:09,920

become a more civilized civilization and

1744

01:17:16,930 --> 01:17:12,650

we can deal with actually having a

1745

01:17:19,000 --> 01:17:16,940

greater degree of power and and the lack

1746

01:17:20,320 --> 01:17:19,010

of scarcity and I say this you're going

1747

01:17:23,590 --> 01:17:20,330

to laugh because it sounds like a joke

1748

01:17:25,450 --> 01:17:23,600

but I don't mean this as a joke I know

1749

01:17:27,880 --> 01:17:25,460

what it's going to be like in the 23rd

1750

01:17:32,620 --> 01:17:27,890

or 24th century because I watched Star

1751

01:17:35,350 --> 01:17:32,630

Trek in particular the concept of the

1752

01:17:37,420 --> 01:17:35,360

replicator is fascinating because with

1753

01:17:39,610 --> 01:17:37,430

the replicator everybody can have as

1754

01:17:42,790 --> 01:17:39,620

much of anything as they want so things

1755

01:17:44,980 --> 01:17:42,800

have no intrinsic value anymore and at

1756

01:17:46,690 --> 01:17:44,990

first probably when the first person

1757

01:17:48,010 --> 01:17:46,700

will build the replicator you know he'll

1758

01:17:48,960 --> 01:17:48,020

use it for all sorts of terrible things

1759

01:17:51,030 --> 01:17:48,970

and build up

1760

01:17:52,950 --> 01:17:51,040

collect demise early and collect all

1761

01:17:55,080 --> 01:17:52,960

sorts of stuff but eventually when

1762

01:17:57,180 --> 01:17:55,090

everybody's got a Replicators at that

1763

01:17:58,770 --> 01:17:57,190

point we'll be able to deal with it we

1764

01:18:00,390 --> 01:17:58,780

won't have this hair city mentality

1765

01:18:01,980 --> 01:18:00,400

there's a historical precedent to

1766

01:18:05,130 --> 01:18:01,990

actually answer that a little bit and it

1767

01:18:07,230 --> 01:18:05,140

has to do with population every single

1768

01:18:09,030 --> 01:18:07,240

nation on this planet regardless of race

1769

01:18:12,620 --> 01:18:09,040

or culture when they get a certain

1770

01:18:15,990 --> 01:18:12,630

degree of material sufficiency stops

1771

01:18:17,970 --> 01:18:16,000

blossoming their population that is an

1772

01:18:19,230 --> 01:18:17,980

example of we've learned how to get

1773

01:18:20,610 --> 01:18:19,240

beyond the scarcity we need more

1774

01:18:24,170 --> 01:18:20,620

children need more children to take care

1775

01:18:26,520 --> 01:18:24,180

of us if I only say enough we're okay I

1776

01:18:32,720 --> 01:18:26,530

do put a little bit of hope in humanity

1777

01:18:37,830 --> 01:18:35,760

just a brief aside in regard to some

1778

01:18:40,560 --> 01:18:37,840

earlier comments about Tesla given

1779

01:18:43,020 --> 01:18:40,570

research that has been seen in SSC and

1780

01:18:44,730 --> 01:18:43,030

elsewhere about biological effects of

1781

01:18:46,620 --> 01:18:44,740

low frequency radiation I think we

1782

01:18:48,600 --> 01:18:46,630

should be grateful that he was not

1783

01:18:54,540 --> 01:18:48,610

allowed to start the entire Earth

1784

01:18:57,180 --> 01:18:54,550

resonating at eight Hertz but on on to a

1785

01:18:59,430 --> 01:18:57,190

question for the panel um that we've

1786

01:19:04,530 --> 01:18:59,440

been doing some brainstorming about the

1787

01:19:07,350 --> 01:19:04,540

effects of having all of these compact

1788

01:19:10,680 --> 01:19:07,360

energy sources in as much abundance as

1789

01:19:13,770 --> 01:19:10,690

they're needed up but how slow and

1790

01:19:16,110 --> 01:19:13,780

painful is it going to be to get there I

1791

01:19:21,780 --> 01:19:16,120

don't know how much is EPF box costs to

1792

01:19:26,280 --> 01:19:21,790

build but uh it sounds like if the semi

1793

01:19:28,590 --> 01:19:26,290

conductor based approach for a second

1794

01:19:32,340 --> 01:19:28,600

law device pans out we're talking about

1795

01:19:33,960 --> 01:19:32,350

something like a coffee can full of what

1796

01:19:35,520 --> 01:19:33,970

amount to microchips that cost something

1797

01:19:37,980 --> 01:19:35,530

like a hundred dollars an ounce to

1798

01:19:40,260 --> 01:19:37,990

manufacture how rapidly can this

1799

01:19:42,510 --> 01:19:40,270

technology be distributed how how

1800

01:19:44,280 --> 01:19:42,520

quickly do you foresee it spreading I've

1801

01:19:47,370 --> 01:19:44,290

heard historically it takes 40 years for

1802

01:19:48,600 --> 01:19:47,380

any new technology to take hold so if

1803

01:19:51,750 --> 01:19:48,610

you if you look at something like the

1804

01:19:53,670 --> 01:19:51,760

nuclear industry at the time December 42

1805

01:19:56,010 --> 01:19:53,680

and Fermi started the first atomic pile

1806

01:19:57,450 --> 01:19:56,020

to when nuclear power plants became

1807

01:20:00,070 --> 01:19:57,460

ubiquitous it was 30 years something

1808

01:20:01,810 --> 01:20:00,080

like that but that was a crash course so

1809

01:20:03,670 --> 01:20:01,820

point energy I've actually priced it out

1810

01:20:05,770 --> 01:20:03,680

because we've talked to investors in

1811

01:20:10,360 --> 01:20:05,780

various other people and it ends up that

1812

01:20:13,270 --> 01:20:10,370

a kilowatt system is far less than a

1813

01:20:17,620 --> 01:20:13,280

hundred dollars and it's producible with

1814

01:20:20,230 --> 01:20:17,630

today's technology just to give you

1815

01:20:22,990 --> 01:20:20,240

specifics we need lots of little

1816

01:20:25,120 --> 01:20:23,000

nanotubes and so on it's essentially a

1817

01:20:27,640 --> 01:20:25,130

CD technology so the way that you make

1818

01:20:30,190 --> 01:20:27,650

cds or dvds and stamp them out we make a

1819

01:20:31,990 --> 01:20:30,200

stack of 20 of those it requires a pump

1820

01:20:34,900 --> 01:20:32,000

the pump is pretty much the same as

1821

01:20:39,349 --> 01:20:34,910

you'd use in an aquarium and a few

1822

01:20:46,829 --> 01:20:41,969

somehow I guess this would be a very

1823

01:20:49,589 --> 01:20:46,839

stimulating evening okay it's now nine