

1
00:00:00,000 --> 00:00:11,939
with Garrett Modell on the far right

2
00:00:03,388 --> 00:00:15,359
Bernie hi and Who am I ken r allen and

3
00:00:11,939 --> 00:00:17,039
and my end I'm Daniel Sheehan the the

4
00:00:15,359 --> 00:00:17,850
format of this is completely flexible we

5
00:00:17,039 --> 00:00:20,010
hope to have lots of audience

6
00:00:17,850 --> 00:00:22,650
participation but what we'd like to talk

7
00:00:20,010 --> 00:00:24,570
about I think our our our visions of

8
00:00:22,649 --> 00:00:26,939
where where the future of energy is and

9
00:00:24,570 --> 00:00:28,560
whether it's going to be the status quo

10
00:00:26,939 --> 00:00:31,679
or whether they're going to be major

11
00:00:28,559 --> 00:00:34,019
changes and how we look at energy and

12
00:00:31,678 --> 00:00:35,390
obviously from the point of view of SSC

13
00:00:34,020 --> 00:00:37,980
we're looking for breakthroughs I think

14
00:00:35,390 --> 00:00:39,420
once represented here I think would be a

15
00:00:37,979 --> 00:00:43,049
vacuum energy and second law primarily

16
00:00:39,420 --> 00:00:45,300
but there are other ones as well for

17
00:00:43,049 --> 00:00:46,468
instance low energy nuclear reactions i

18
00:00:45,299 --> 00:00:48,959
think Garrett's a little bit involved in

19
00:00:46,469 --> 00:00:51,840
that as well or just starting to but

20
00:00:48,960 --> 00:00:53,789
there are a number of them and i think

21
00:00:51,840 --> 00:00:59,250
all of us can see some of the fruits of

22
00:00:53,789 --> 00:01:01,280
the the current energy dilemma where the

23
00:00:59,250 --> 00:01:03,390
price of oil can fluctuate between

24
00:01:01,280 --> 00:01:06,570
forty dollars a barrel one hundred fifty

25
00:01:03,390 --> 00:01:09,319
dollars a barrel leading to not just

26
00:01:06,569 --> 00:01:12,000
energy shortages but food shortages as

27
00:01:09,319 --> 00:01:14,639
the united states plows more of its a

28
00:01:12,000 --> 00:01:16,950
corn and makes it into biofuels and

29

00:01:14,640 --> 00:01:19,590
makes makes corn and expensive commodity

30
00:01:16,950 --> 00:01:20,790
on the world market or the disaster in

31
00:01:19,590 --> 00:01:22,439
the gulf that we're seeing unfold and

32
00:01:20,790 --> 00:01:26,729
may not be solved for many months or

33
00:01:22,438 --> 00:01:28,349
years ahead we pay the price energy is

34
00:01:26,728 --> 00:01:30,688
lifeblood of civilization without it you

35
00:01:28,349 --> 00:01:31,919
cannot have civilization but at the same

36
00:01:30,688 --> 00:01:33,959
time there are many drawbacks which

37
00:01:31,920 --> 00:01:36,618
we're seeing in terms of things like as

38
00:01:33,959 --> 00:01:39,059
broad as climate change global warming

39
00:01:36,618 --> 00:01:41,280
the rise in co2 levels in the atmosphere

40
00:01:39,060 --> 00:01:43,978
the acidification of the oceans many

41
00:01:41,280 --> 00:01:47,040
things so if we can find alternatives

42
00:01:43,978 --> 00:01:49,259
which are clean green plentiful high

43
00:01:47,040 --> 00:01:51,600

power densities and so on we this

44

00:01:49,259 --> 00:01:53,459

society may be one of the one of the

45

00:01:51,599 --> 00:01:55,199

Keystone's one of the linchpins in a

46

00:01:53,459 --> 00:01:57,449

revolution which which is not just an

47

00:01:55,200 --> 00:02:01,020

energy but in societal transformation in

48

00:01:57,450 --> 00:02:02,430

the way we steward our planet so this

49

00:02:01,019 --> 00:02:03,989

will be a wide-ranging discussion and

50

00:02:02,430 --> 00:02:05,579

again we we would like to see as much

51

00:02:03,989 --> 00:02:07,140

audience participation as possible

52

00:02:05,578 --> 00:02:08,769

because we don't know very much up here

53

00:02:07,140 --> 00:02:10,840

I don't think

54

00:02:08,770 --> 00:02:23,830

I think it wants to start off with a few

55

00:02:10,840 --> 00:02:26,039

slides sorry really i thought you were

56

00:02:23,830 --> 00:02:26,040

joking

57

00:02:33,129 --> 00:02:43,389

ah there you are hello Thank You Daniel

58
00:02:38,169 --> 00:02:45,009
so what I want to do here is just in as

59
00:02:43,389 --> 00:02:47,889
Daniel suggested sort of stimulate

60
00:02:45,009 --> 00:02:51,340
discussion with talking about some of

61
00:02:47,889 --> 00:02:53,679
the basic energy principles that were

62
00:02:51,340 --> 00:02:57,610
that we're dealing with in trying to

63
00:02:53,680 --> 00:02:59,170
look for new energy and I'll go through

64
00:02:57,610 --> 00:03:02,770
these slides fairly quickly and just

65
00:02:59,169 --> 00:03:05,109
described my view on it we may or may

66
00:03:02,770 --> 00:03:06,850
not take you use these as a take-off for

67
00:03:05,110 --> 00:03:09,850
discussion depending on what other

68
00:03:06,849 --> 00:03:12,639
people have to say just in response to

69
00:03:09,849 --> 00:03:14,680
Kim and Daniel's quotes about zero point

70
00:03:12,639 --> 00:03:17,769
energy I just while they were talking I

71
00:03:14,680 --> 00:03:20,170
pulled this one up which is Albert

72
00:03:17,770 --> 00:03:21,820
Einstein's and he said classical

73
00:03:20,169 --> 00:03:24,699
thermodynamics is the only physical

74
00:03:21,819 --> 00:03:26,590
theory of universal content which I am

75
00:03:24,699 --> 00:03:28,479
convinced will never be overthrown um

76
00:03:26,590 --> 00:03:29,560
that's a nice one I actually put that

77
00:03:28,479 --> 00:03:31,859
have that at the end of one of my

78
00:03:29,560 --> 00:03:35,469
articles and if you look at what it says

79
00:03:31,860 --> 00:03:37,480
it's tautological it says classical

80
00:03:35,469 --> 00:03:40,719
thermodynamics will never be overthrown

81
00:03:37,479 --> 00:03:42,519
where it applies which means that it

82
00:03:40,719 --> 00:03:45,009
will never be overthrown where it is

83
00:03:42,520 --> 00:03:50,650
valid well that's fine but it will be

84
00:03:45,009 --> 00:03:54,879
overthrown where it is not valid I won't

85
00:03:50,650 --> 00:03:56,260
I'll leave it leave it as it is so I

86

00:03:54,879 --> 00:03:59,710
we've all talked a little bit about

87
00:03:56,259 --> 00:04:01,599
Maxwell's demon and I don't III agree

88
00:03:59,710 --> 00:04:03,849
with you know what everybody has said

89
00:04:01,599 --> 00:04:05,169
about it what I want to do is just talk

90
00:04:03,849 --> 00:04:07,900
a little bit about the second law of

91
00:04:05,169 --> 00:04:09,819
thermodynamics from just yet another

92
00:04:07,900 --> 00:04:15,490
perspective because it's such a profound

93
00:04:09,819 --> 00:04:17,409
profound law and that is that originally

94
00:04:15,490 --> 00:04:20,709
it was developed in its various forms

95
00:04:17,410 --> 00:04:23,410
and I think you quoted eighteen

96
00:04:20,709 --> 00:04:26,319
different variations of it was out

97
00:04:23,410 --> 00:04:30,220
correct to learn something like that it

98
00:04:26,319 --> 00:04:33,849
originally evolved from an experimental

99
00:04:30,220 --> 00:04:37,780
view of burning what happens if you

100
00:04:33,850 --> 00:04:40,200

convert heat into work and what the

101

00:04:37,779 --> 00:04:43,609
limits are then later it was

102

00:04:40,199 --> 00:04:47,810
reconstituted in its statistical form

103

00:04:43,610 --> 00:04:50,389
and it's statistical form simply says

104

00:04:47,810 --> 00:04:52,668
that you've got a couple of basic

105

00:04:50,389 --> 00:04:55,819
assumptions one is let's say that we've

106

00:04:52,668 --> 00:04:59,709
got a system of ideal gas in a chamber

107

00:04:55,819 --> 00:05:05,240
and so if we assume that that ideal gas

108

00:04:59,709 --> 00:05:07,279
is in a number accountable number of

109

00:05:05,240 --> 00:05:08,750
different configurations in other words

110

00:05:07,279 --> 00:05:11,688
we can either have this particle over

111

00:05:08,750 --> 00:05:14,389
here or over there or over there and the

112

00:05:11,689 --> 00:05:17,509
number of different states of that

113

00:05:14,389 --> 00:05:22,250
system can be somehow enumerated and

114

00:05:17,509 --> 00:05:23,990
it's a huge huge number that's one basic

115
00:05:22,250 --> 00:05:26,959
assumption and the other basic

116
00:05:23,990 --> 00:05:30,139
assumption is that these states are all

117
00:05:26,959 --> 00:05:33,918
equally likely so if you take those two

118
00:05:30,139 --> 00:05:37,848
ideas then you say okay let's put all of

119
00:05:33,918 --> 00:05:41,028
the gas into one half of the chamber and

120
00:05:37,848 --> 00:05:43,188
let time pass well the gas is going to

121
00:05:41,028 --> 00:05:48,019
redistribute itself over the entire

122
00:05:43,189 --> 00:05:51,009
chamber and it will get into a state in

123
00:05:48,019 --> 00:05:54,528
which it's got the most possible

124
00:05:51,009 --> 00:05:56,750
configurations so it's it will get into

125
00:05:54,528 --> 00:06:00,050
a state where it's spread out because

126
00:05:56,750 --> 00:06:02,060
that's the most possible ways that you

127
00:06:00,050 --> 00:06:03,710
can distribute the gas end up with their

128
00:06:02,060 --> 00:06:05,209
weather being in a state where its most

129
00:06:03,709 --> 00:06:07,968
spread out I didn't say that very well

130
00:06:05,209 --> 00:06:12,370
that I think you got the basic idea so

131
00:06:07,968 --> 00:06:16,069
uh and from that we can say what

132
00:06:12,370 --> 00:06:20,829
equilibrium is that equilibrium occurs

133
00:06:16,069 --> 00:06:25,419
when the gas or electrons or heat or

134
00:06:20,829 --> 00:06:27,948
particles or thoughts are in the most

135
00:06:25,418 --> 00:06:32,718
spread out state in the state of

136
00:06:27,949 --> 00:06:35,270
greatest multiplicity and so then we

137
00:06:32,718 --> 00:06:38,449
have good old Maxwell's demon who tries

138
00:06:35,269 --> 00:06:41,418
to disobey it and as Daniel Sheehan said

139
00:06:38,449 --> 00:06:43,669
ultimately the reason that Maxwell's

140
00:06:41,418 --> 00:06:46,218
demon cannot work in this type of a

141
00:06:43,668 --> 00:06:48,918
configuration has to do with information

142
00:06:46,218 --> 00:06:51,079
because he has to eject information when

143

00:06:48,918 --> 00:06:53,000
he forgets one configuration of the

144
00:06:51,079 --> 00:06:54,769
system to move to the next configuration

145
00:06:53,000 --> 00:06:55,889
and at this point it's pretty well

146
00:06:54,769 --> 00:06:57,718
established

147
00:06:55,889 --> 00:07:01,348
information entropy and thermodynamic

148
00:06:57,718 --> 00:07:03,209
entropy are the same thing so the second

149
00:07:01,348 --> 00:07:05,399
law of thermodynamics has been around I

150
00:07:03,209 --> 00:07:06,989
as I mentioned a little bit earlier and

151
00:07:05,399 --> 00:07:09,060
probably going to be end up being the

152
00:07:06,990 --> 00:07:11,249
conservative person on this panel just

153
00:07:09,060 --> 00:07:17,038
in that from my perspective I haven't

154
00:07:11,249 --> 00:07:19,069
seen deviations from it so we there are

155
00:07:17,038 --> 00:07:21,870
a number of different types of

156
00:07:19,069 --> 00:07:25,379
situations where we'd like to extract

157
00:07:21,870 --> 00:07:27,449

energy from a uniform distribution but

158

00:07:25,379 --> 00:07:28,680

we can't extract it from a uniform

159

00:07:27,449 --> 00:07:30,478

distribution unless there is a

160

00:07:28,680 --> 00:07:33,090

difference there needs to be some

161

00:07:30,478 --> 00:07:35,610

difference to drive it so imagine the

162

00:07:33,089 --> 00:07:40,019

ocean being totally flat and we want the

163

00:07:35,610 --> 00:07:45,180

flowing of water to then give us some

164

00:07:40,019 --> 00:07:47,098

sort of a harvestable energy and this is

165

00:07:45,180 --> 00:07:49,019

not exactly the second law of

166

00:07:47,098 --> 00:07:50,810

thermodynamics but it's pretty close to

167

00:07:49,019 --> 00:07:52,948

it saying that when you've got

168

00:07:50,810 --> 00:07:56,338

equilibrium when you've got a uniform

169

00:07:52,949 --> 00:07:58,319

distribution it's impossible to get work

170

00:07:56,338 --> 00:08:00,959

out of it now there are several

171

00:07:58,319 --> 00:08:04,979

ingenious schemes Daniels and Ken's

172
00:08:00,959 --> 00:08:07,168
which attempt to do so and I imagine it

173
00:08:04,978 --> 00:08:09,478
if they want they'll explain why this

174
00:08:07,168 --> 00:08:13,408
particular scheme doesn't apply in their

175
00:08:09,478 --> 00:08:14,878
situation i am bernie will talk about

176
00:08:13,408 --> 00:08:17,310
another one where we say this doesn't

177
00:08:14,879 --> 00:08:19,710
apply and that has to do with the

178
00:08:17,310 --> 00:08:22,620
zero-point energy because with zero

179
00:08:19,709 --> 00:08:24,870
point energy there is a situation in

180
00:08:22,620 --> 00:08:27,000
which the sea level is not flat and

181
00:08:24,870 --> 00:08:29,579
that's when you've got a Casimir cavity

182
00:08:27,000 --> 00:08:32,729
so when you at the mouth of the Casimir

183
00:08:29,579 --> 00:08:35,639
cavity inside the Casimir cavity there

184
00:08:32,729 --> 00:08:37,949
is a lower energy level than there is

185
00:08:35,639 --> 00:08:39,778
outside and you just can stand there for

186
00:08:37,948 --> 00:08:41,809
as long as you like and you will end up

187
00:08:39,778 --> 00:08:45,419
with this difference it's it's like

188
00:08:41,809 --> 00:08:47,849
Moses walking through the Red Sea and

189
00:08:45,419 --> 00:08:49,919
they're genuinely is this difference in

190
00:08:47,850 --> 00:08:53,149
the sea level so for that reason Bernie

191
00:08:49,919 --> 00:08:56,219
and I believe there's a possibility of

192
00:08:53,149 --> 00:08:59,370
harvesting a zero-point energy by making

193
00:08:56,220 --> 00:09:03,180
use of this difference as a driving

194
00:08:59,370 --> 00:09:04,560
force for in casimir cavities and again

195
00:09:03,179 --> 00:09:08,019
I'm not going to go into great detail

196
00:09:04,559 --> 00:09:10,219
here so

197
00:09:08,019 --> 00:09:12,110
something that's troubled me from the

198
00:09:10,220 --> 00:09:13,610
very beginning as I've been working with

199
00:09:12,110 --> 00:09:16,550
new energies and this has been for a

200

00:09:13,610 --> 00:09:20,840
number of years now is if there is an

201
00:09:16,549 --> 00:09:22,699
energy source presumably Nature has made

202
00:09:20,840 --> 00:09:26,450
use of it because nature is extremely

203
00:09:22,700 --> 00:09:29,570
ingenious either physical nature or a

204
00:09:26,450 --> 00:09:31,700
living nature and so let's look at some

205
00:09:29,570 --> 00:09:34,550
different forms of energy and see

206
00:09:31,700 --> 00:09:37,960
whether nature has made use of them so

207
00:09:34,549 --> 00:09:40,429
one for example and the mechanical

208
00:09:37,960 --> 00:09:43,280
gravitational energy well certainly

209
00:09:40,429 --> 00:09:44,839
Nature has made use of mechanical and

210
00:09:43,279 --> 00:09:49,699
gravitational energy and we see that all

211
00:09:44,840 --> 00:09:52,310
over the place second one what about

212
00:09:49,700 --> 00:09:54,230
chemical energy when we burn something

213
00:09:52,309 --> 00:09:56,269
or we have a chemical reaction well

214
00:09:54,230 --> 00:10:00,370

clearly we see that all over the place

215

00:09:56,269 --> 00:10:02,720

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

216

00:10:00,370 --> 00:10:05,899

form for energy and so I've got

217

00:10:02,720 --> 00:10:09,080

confidence that we can use that what

218

00:10:05,899 --> 00:10:11,209

about the conversion of light into a

219

00:10:09,080 --> 00:10:12,950

usable form of energy let's say I never

220

00:10:11,210 --> 00:10:15,200

have seen a solar cell and I'm wondering

221

00:10:12,950 --> 00:10:18,110

is it possible to build a solar cell

222

00:10:15,200 --> 00:10:20,690

well on nature uses photosynthesis all

223

00:10:18,110 --> 00:10:24,230

the time and so that seems to me to be a

224

00:10:20,690 --> 00:10:27,230

pretty feasible one and i can see nature

225

00:10:24,230 --> 00:10:29,180

does it so what about electromagnetic

226

00:10:27,230 --> 00:10:32,210

let's say i want to build a motor in

227

00:10:29,179 --> 00:10:37,039

which i convert electricity into into

228

00:10:32,210 --> 00:10:40,879

work or electric potential into into

229
00:10:37,039 --> 00:10:43,789
work well certainly I see the effects of

230
00:10:40,879 --> 00:10:46,490
electromagnetics within nature not only

231
00:10:43,789 --> 00:10:48,679
enlightening but actually as many of us

232
00:10:46,490 --> 00:10:51,620
now know the electric universe is

233
00:10:48,679 --> 00:10:54,769
becoming something of a hot topic and

234
00:10:51,620 --> 00:10:56,690
that electricity drives not only things

235
00:10:54,769 --> 00:11:03,549
here on earth but it may very well drive

236
00:10:56,690 --> 00:11:06,380
cosmology what about a thermal or wind

237
00:11:03,549 --> 00:11:08,959
vibrational variations or wind if I want

238
00:11:06,379 --> 00:11:11,200
to build a windmill can I do it well we

239
00:11:08,960 --> 00:11:14,710
know that nature does make use of wind I

240
00:11:11,200 --> 00:11:14,710
love this picture

241
00:11:14,929 --> 00:11:21,629
so what else what about nuclear well you

242
00:11:20,429 --> 00:11:23,609
know we've got evidence that

243
00:11:21,629 --> 00:11:26,100
thermonuclear reactions are occurring in

244
00:11:23,610 --> 00:11:28,789
the Sun and in stars and so that seems

245
00:11:26,100 --> 00:11:31,639
like a reasonable thing for us to use

246
00:11:28,789 --> 00:11:35,009
well what about zero point energy and

247
00:11:31,639 --> 00:11:38,039
here I'm troubled and I put a big

248
00:11:35,009 --> 00:11:40,529
question mark up there may be zero point

249
00:11:38,039 --> 00:11:42,959
energy is being used as a source of

250
00:11:40,529 --> 00:11:45,389
energy within stars we don't really know

251
00:11:42,960 --> 00:11:51,930
we don't have evidence that it's not am

252
00:11:45,389 --> 00:11:55,559
I right Bernie so but the but we don't

253
00:11:51,929 --> 00:11:57,689
have evidence but it really is a point

254
00:11:55,559 --> 00:11:59,639
energy source so I don't know and that

255
00:11:57,690 --> 00:12:01,830
troubles me given that you know my lab

256
00:11:59,639 --> 00:12:03,779
has done a fair bit of work looking to

257

00:12:01,830 --> 00:12:06,270
harvest zero-point energy well and

258
00:12:03,779 --> 00:12:08,209
Garrett I mean zero point energy I mean

259
00:12:06,269 --> 00:12:10,439
with the zero-point feels important in

260
00:12:08,210 --> 00:12:12,750
dozens of different physical phenomena I

261
00:12:10,440 --> 00:12:15,240
mean certainly it's invoked from van der

262
00:12:12,750 --> 00:12:17,159
Waals forces and and spontaneous or

263
00:12:15,240 --> 00:12:18,899
maybe no question there are lots of

264
00:12:17,159 --> 00:12:21,240
physical manifestations of zero point

265
00:12:18,899 --> 00:12:23,100
energy so to say that it's that because

266
00:12:21,240 --> 00:12:25,440
an organism doesn't necessarily exploit

267
00:12:23,100 --> 00:12:27,000
it I mean it certainly is it's it's it's

268
00:12:25,440 --> 00:12:28,410
fundamental I me if you ask Dan Cole he

269
00:12:27,000 --> 00:12:30,029
says almost every process in nature

270
00:12:28,409 --> 00:12:32,009
depends on zero point energy when we

271
00:12:30,029 --> 00:12:33,149

were absolutely I agree I agree a

272

00:12:32,009 --> 00:12:36,450
hundred percent with everything you've

273

00:12:33,149 --> 00:12:40,399
said except the one part about

274

00:12:36,450 --> 00:12:43,560
exploiting because Nature doesn't you

275

00:12:40,399 --> 00:12:46,889
when we don't recognize it yet but it

276

00:12:43,559 --> 00:12:48,929
may be there well actually I that may be

277

00:12:46,889 --> 00:12:50,340
true because when Bernie Bernie first

278

00:12:48,929 --> 00:12:54,000
approached me with a zero point energy

279

00:12:50,340 --> 00:12:57,870
idea I spent a lot of time fighting

280

00:12:54,000 --> 00:12:59,850
Bernie and I did some calculations to

281

00:12:57,870 --> 00:13:01,710
see what the pumping energy would be and

282

00:12:59,850 --> 00:13:04,560
turned out the pumping energy for Bernie

283

00:13:01,710 --> 00:13:06,210
scheme was fine then I did a number of

284

00:13:04,559 --> 00:13:09,029
things and in every case it came out

285

00:13:06,210 --> 00:13:10,980
okay another thing I did is I was

286
00:13:09,029 --> 00:13:14,069
thinking what we're in nature does the

287
00:13:10,980 --> 00:13:16,350
zero-point energy used and the one place

288
00:13:14,070 --> 00:13:19,820
that intrigues me and it still kind of

289
00:13:16,350 --> 00:13:24,930
intrigues me is fungus and mushrooms

290
00:13:19,820 --> 00:13:26,220
because we know that fungus are the

291
00:13:24,929 --> 00:13:27,750
biggest life-forms on Earth either

292
00:13:26,220 --> 00:13:29,279
fungus or aspen trees I'm not

293
00:13:27,750 --> 00:13:32,549
which but they're there they're

294
00:13:29,279 --> 00:13:36,059
absolutely huge you know their many the

295
00:13:32,549 --> 00:13:38,189
size of this hotel and we the

296
00:13:36,059 --> 00:13:41,729
conventional wisdom is that fungus uses

297
00:13:38,190 --> 00:13:43,650
a decaying organic matter as its energy

298
00:13:41,730 --> 00:13:45,690
source on the other hand fungus has

299
00:13:43,649 --> 00:13:49,409
these little tubes in it that sure are

300

00:13:45,690 --> 00:13:51,180
like casimir cavities and it just sort

301

00:13:49,409 --> 00:13:53,759
of makes me wonder it would be a lot of

302

00:13:51,179 --> 00:13:57,449
fun to try to do an experiment and see

303

00:13:53,759 --> 00:14:00,750
does fungus somehow produce more energy

304

00:13:57,450 --> 00:14:04,050
than it appears to consume but you know

305

00:14:00,750 --> 00:14:05,250
I'm still looking so I can I I agree

306

00:14:04,049 --> 00:14:07,949
with you you know they're there may be

307

00:14:05,250 --> 00:14:10,889
forms we haven't found but it troubles

308

00:14:07,950 --> 00:14:13,379
me that we haven't found them and then

309

00:14:10,889 --> 00:14:15,149
this if we look at other sort of

310

00:14:13,379 --> 00:14:19,439
potential steps and I use this potential

311

00:14:15,149 --> 00:14:21,899
step simply because of Daniels scheme

312

00:14:19,440 --> 00:14:25,140
which which involves a semiconductor

313

00:14:21,899 --> 00:14:27,959
Junction and have we seen nature make

314

00:14:25,139 --> 00:14:30,629
use of these things well we haven't and

315
00:14:27,960 --> 00:14:32,700
does that mean we can't do it no because

316
00:14:30,629 --> 00:14:35,189
we certainly go many places that nature

317
00:14:32,700 --> 00:14:36,930
hasn't gone on the other hand it

318
00:14:35,190 --> 00:14:41,520
troubles me a little bit so I leave it

319
00:14:36,929 --> 00:14:43,019
at that well I'd like to make an

320
00:14:41,519 --> 00:14:44,490
immediate response to the to the last

321
00:14:43,019 --> 00:14:46,710
argument which is that because nature

322
00:14:44,490 --> 00:14:49,529
hasn't exploited it yet that somehow

323
00:14:46,710 --> 00:14:51,180
that we will not be able to either I

324
00:14:49,529 --> 00:14:54,209
mean you don't look around you don't

325
00:14:51,179 --> 00:14:56,669
walk through Antarctica or I'll say the

326
00:14:54,210 --> 00:14:58,710
deep dark of Africa places people

327
00:14:56,669 --> 00:15:00,149
haven't been and find internal

328
00:14:58,710 --> 00:15:02,250

combustion engines sitting on the ground

329

00:15:00,149 --> 00:15:05,069

they don't spontaneously rise in or do

330

00:15:02,250 --> 00:15:07,679

747s we've been able to achieve

331

00:15:05,070 --> 00:15:09,960

temperatures down near you know 10 or

332

00:15:07,679 --> 00:15:11,159

100 nano Kelvin and nature only produces

333

00:15:09,960 --> 00:15:13,320

temperatures down to three kelp and

334

00:15:11,159 --> 00:15:14,909

we've gone a temperature difference of a

335

00:15:13,320 --> 00:15:17,129

factor of a million or a billion below

336

00:15:14,909 --> 00:15:18,179

what nature can achieve we have

337

00:15:17,129 --> 00:15:21,600

computers which don't spontaneously

338

00:15:18,179 --> 00:15:23,159

arise so the fat and if you have if you

339

00:15:21,600 --> 00:15:24,420

have a gallon of gasoline sitting on on

340

00:15:23,159 --> 00:15:25,799

in the middle of a field it's never

341

00:15:24,419 --> 00:15:27,929

going to do anything without building an

342

00:15:25,799 --> 00:15:29,189

internal combustion engine to make use

343
00:15:27,929 --> 00:15:31,229
of it it's not going to do any really

344
00:15:29,190 --> 00:15:35,470
useful work for you it'll just simply

345
00:15:31,230 --> 00:15:37,149
degrade over time um nature

346
00:15:35,470 --> 00:15:40,600
should have built an internal combustion

347
00:15:37,149 --> 00:15:43,240
engine and I misspoke what I meant to

348
00:15:40,600 --> 00:15:47,580
say I thought I said it was it hasn't

349
00:15:43,240 --> 00:15:49,779
used a particular type of reaction right

350
00:15:47,580 --> 00:15:51,040
right well as well the second law is a

351
00:15:49,779 --> 00:15:52,629
subtle thing I mean I certainly would

352
00:15:51,039 --> 00:15:54,610
say that it hasn't there's no obvious

353
00:15:52,629 --> 00:15:56,559
violation of it up to now but that

354
00:15:54,610 --> 00:15:58,240
doesn't mean that a violation cannot be

355
00:15:56,559 --> 00:16:01,839
achieved through through clever

356
00:15:58,240 --> 00:16:05,470
construction now there are man-made

357
00:16:01,840 --> 00:16:08,259
things that do not exist in nature we

358
00:16:05,470 --> 00:16:10,570
know that tornadoes and storms and other

359
00:16:08,259 --> 00:16:13,059
things like that are heat engines but

360
00:16:10,570 --> 00:16:14,950
they're open cycle we have closed cycle

361
00:16:13,059 --> 00:16:16,959
heat engines by the millions if not

362
00:16:14,950 --> 00:16:20,560
billions on this planet and I have yet

363
00:16:16,960 --> 00:16:30,970
to see one in nature again I think

364
00:16:20,559 --> 00:16:33,159
you're taking okay okay sure okay I'd

365
00:16:30,970 --> 00:16:36,639
like to address the first of Ken's

366
00:16:33,159 --> 00:16:39,309
statements which is that somehow the the

367
00:16:36,639 --> 00:16:41,799
conformance of ideal gases and in finite

368
00:16:39,309 --> 00:16:46,329
and finite containers to the second law

369
00:16:41,799 --> 00:16:48,250
somehow extends to two other kinds of

370
00:16:46,330 --> 00:16:50,740
devices i think i think i can show that

371

00:16:48,250 --> 00:16:52,330
it really doesn't and in fact the second

372
00:16:50,740 --> 00:16:53,799
law of devices least that our groups

373
00:16:52,330 --> 00:16:57,250
proposing San Diego has more in common

374
00:16:53,799 --> 00:16:59,649
with with with with the zero-point

375
00:16:57,250 --> 00:17:00,789
engine you're talking about a zero-point

376
00:16:59,649 --> 00:17:03,399
engine you're talking about that you

377
00:17:00,789 --> 00:17:05,019
might imagine so let me use a some low

378
00:17:03,399 --> 00:17:07,230
tech stuff and kind of try to explain

379
00:17:05,019 --> 00:17:07,230
what I mean

380
00:17:18,299 --> 00:17:24,399
okay from the audience how does how does

381
00:17:21,369 --> 00:17:27,609
a hydroelectric power plant work what is

382
00:17:24,400 --> 00:17:30,130
it what does it make use of makes use of

383
00:17:27,609 --> 00:17:33,309
gravity but it's not just gravitational

384
00:17:30,130 --> 00:17:37,530
potential it's a gravitational potential

385
00:17:33,309 --> 00:17:37,529

gradient right you have a the other damn

386

00:17:39,960 --> 00:17:45,400

water water in the back and the water

387

00:17:43,180 --> 00:17:46,750

falls through the damn turns a turbine

388

00:17:45,400 --> 00:17:49,360

which turns a generator which makes

389

00:17:46,750 --> 00:17:51,700

electricity get that straight thank you

390

00:17:49,359 --> 00:17:54,909

so you have a gravitational potential

391

00:17:51,700 --> 00:17:56,590

difference between pens not working very

392

00:17:54,910 --> 00:18:00,940

well as anyone have a pen many chance

393

00:17:56,589 --> 00:18:02,829

fell pen no okay gravitational potential

394

00:18:00,940 --> 00:18:06,430

gradient how about when you drive

395

00:18:02,829 --> 00:18:08,710

electricity voltage does not does not

396

00:18:06,430 --> 00:18:10,990

accelerate charges it's a voltage

397

00:18:08,710 --> 00:18:13,690

gradient that accelerates charges

398

00:18:10,990 --> 00:18:15,849

electric field accelerate charges so

399

00:18:13,690 --> 00:18:17,470

it's the gradient in the potential that

400
00:18:15,849 --> 00:18:19,559
accelerates charges in any kind of

401
00:18:17,470 --> 00:18:23,049
electronic device that accelerates

402
00:18:19,559 --> 00:18:26,740
masses in a gravitational field it's the

403
00:18:23,049 --> 00:18:28,180
gradient that does that so in in the PN

404
00:18:26,740 --> 00:18:36,069
junctions that we're being discussed

405
00:18:28,180 --> 00:18:39,330
this afternoon I really need a does

406
00:18:36,069 --> 00:18:45,279
anyone have anything like a felt pen

407
00:18:39,329 --> 00:18:48,240
anything at all okay Oh a sharpie

408
00:18:45,279 --> 00:18:48,240
exactly yeah

409
00:18:48,569 --> 00:18:54,509
alright employment level okay so we have

410
00:18:52,169 --> 00:18:56,788
an N and P region here and as a result

411
00:18:54,509 --> 00:18:58,798
of electrons going this way and holes

412
00:18:56,788 --> 00:19:02,278
going the other way we end up with an

413
00:18:58,798 --> 00:19:05,339
electric field in the material but it's

414
00:19:02,278 --> 00:19:06,778
very small it's micron sized and but but

415
00:19:05,339 --> 00:19:08,849
it's that electric field that gets

416
00:19:06,778 --> 00:19:11,159
developed in this PN Junction which is

417
00:19:08,849 --> 00:19:13,019
ultimately exploited to create the

418
00:19:11,159 --> 00:19:16,350
energy to drive these oscillators that

419
00:19:13,019 --> 00:19:19,079
we my colleagues and I are working on so

420
00:19:16,349 --> 00:19:21,178
the same kinds of potentials different

421
00:19:19,079 --> 00:19:22,199
gradients that are used to drive regular

422
00:19:21,179 --> 00:19:24,419
electric circuits which you're familiar

423
00:19:22,200 --> 00:19:27,360
with are the same kinds of electric

424
00:19:24,419 --> 00:19:30,240
fields that we're exploiting at the

425
00:19:27,359 --> 00:19:31,439
microscopic level for our devices the

426
00:19:30,240 --> 00:19:33,269
difference is the reason why these

427
00:19:31,440 --> 00:19:35,399
haven't been looked at is because

428

00:19:33,269 --> 00:19:36,899
they're microscopic in back 150 years

429
00:19:35,398 --> 00:19:38,729
ago there's no one who could who could

430
00:19:36,898 --> 00:19:41,668
imagine or even think of something like

431
00:19:38,730 --> 00:19:43,048
a PN diode it wasn't available but it is

432
00:19:41,669 --> 00:19:44,820
the gradient in the in the potential

433
00:19:43,048 --> 00:19:46,918
that's important and this is an

434
00:19:44,819 --> 00:19:48,658
equilibrium system this is thermal

435
00:19:46,919 --> 00:19:51,960
equilibrium thermal equilibrium does

436
00:19:48,659 --> 00:19:54,509
create and does have macroscopic

437
00:19:51,960 --> 00:19:56,819
potential gradients which can be

438
00:19:54,509 --> 00:19:58,620
exploited in the same fashion that the

439
00:19:56,819 --> 00:20:01,558
non-equilibrium ones which are created

440
00:19:58,619 --> 00:20:04,528
through electric generators or electric

441
00:20:01,558 --> 00:20:06,658
or chemical motors or whatever else also

442
00:20:04,528 --> 00:20:08,190

create so what we're doing is not that

443

00:20:06,659 --> 00:20:09,870

much different in a sense even from what

444

00:20:08,190 --> 00:20:12,899

you're doing you're you are creating

445

00:20:09,869 --> 00:20:14,878

boundary conditions with in order to

446

00:20:12,898 --> 00:20:17,189

create cavities which have differential

447

00:20:14,878 --> 00:20:19,519

amounts of zero point in them we're

448

00:20:17,190 --> 00:20:22,710

creating special geometries which create

449

00:20:19,519 --> 00:20:24,450

gradients and differences in electric

450

00:20:22,710 --> 00:20:26,190

fields which allow us to do work to

451

00:20:24,450 --> 00:20:27,960

ultimately if you want to do work you

452

00:20:26,190 --> 00:20:31,070

need you need to have things like

453

00:20:27,960 --> 00:20:33,298

potential gradients and particle fluxes

454

00:20:31,069 --> 00:20:35,609

equilibrium systems allow for this so

455

00:20:33,298 --> 00:20:37,798

and this is not an ideal gas but it is

456

00:20:35,609 --> 00:20:40,138

an equilibrium system so the various

457
00:20:37,798 --> 00:20:42,418
systems i've looked at plasma systems on

458
00:20:40,138 --> 00:20:46,138
solid state systems chemical systems all

459
00:20:42,419 --> 00:20:47,820
involve these macroscopic potential

460
00:20:46,138 --> 00:20:50,699
gradients which arise spontaneously at

461
00:20:47,819 --> 00:20:51,778
equilibrium and so i think they share so

462
00:20:50,700 --> 00:20:55,110
much in common with what we already

463
00:20:51,778 --> 00:20:57,809
considered to be legitimate engines in

464
00:20:55,109 --> 00:20:59,519
this case it's also an atomic process

465
00:20:57,809 --> 00:21:01,589
can be very different like we've seen

466
00:20:59,519 --> 00:21:04,079
nature of quantum mechanics another

467
00:21:01,589 --> 00:21:06,480
thing from our macroscopic experience

468
00:21:04,079 --> 00:21:08,909
that that's right this this this invokes

469
00:21:06,480 --> 00:21:10,740
biomechanics and safaris you have you

470
00:21:08,910 --> 00:21:13,080
have band structures and so on yes rival

471
00:21:10,740 --> 00:21:16,019
limited energy states to distribute the

472
00:21:13,079 --> 00:21:17,970
time right listen that is the case

473
00:21:16,019 --> 00:21:20,009
nonetheless these are not based on

474
00:21:17,970 --> 00:21:21,809
fluctuations this is not a Maxwell demon

475
00:21:20,009 --> 00:21:23,579
there's not information being processed

476
00:21:21,809 --> 00:21:26,789
here by some sort of thinking creature

477
00:21:23,579 --> 00:21:30,740
this this this kind of machine doesn't

478
00:21:26,789 --> 00:21:30,740
think it simply does much like a motor

479
00:21:31,099 --> 00:21:36,959
yeah yes the water falls off the falls

480
00:21:34,769 --> 00:21:39,029
off down damn and Drazen truth and so on

481
00:21:36,960 --> 00:21:41,069
Roger requires another source to get

482
00:21:39,029 --> 00:21:43,440
that water back up to the top okay

483
00:21:41,069 --> 00:21:44,819
sometimes gotta cause rain the rain then

484
00:21:43,440 --> 00:21:49,529
falls and he pisses me going is the

485

00:21:44,819 --> 00:21:50,879
sound of driving that's correct okay so

486
00:21:49,529 --> 00:21:54,539
so what you're saying is that you're

487
00:21:50,880 --> 00:21:56,160
you're exhausting a free energy system

488
00:21:54,539 --> 00:21:57,750
which and ultimately is the Sun fusion

489
00:21:56,160 --> 00:21:58,890
energy to create the sunlight which

490
00:21:57,750 --> 00:22:00,480
creates evaporation creates

491
00:21:58,890 --> 00:22:01,800
gravitational potential energy there is

492
00:22:00,480 --> 00:22:03,269
a difference that's right and that's why

493
00:22:01,799 --> 00:22:05,119
I always violates the second law and the

494
00:22:03,269 --> 00:22:07,470
other ones don't is because I was

495
00:22:05,119 --> 00:22:09,059
regenerate themselves through strictly

496
00:22:07,470 --> 00:22:10,289
thermal processes and that and so it

497
00:22:09,059 --> 00:22:11,429
kind of begs the question to say well

498
00:22:10,289 --> 00:22:12,659
they're different they are different

499
00:22:11,430 --> 00:22:15,480

because one violate the second law and

500

00:22:12,660 --> 00:22:18,980

the other one doesn't but the processes

501

00:22:15,480 --> 00:22:18,980

are similar yes

502

00:22:25,710 --> 00:22:31,029

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

503

00:22:29,470 --> 00:22:32,710

getting energy out of our system you

504

00:22:31,029 --> 00:22:34,599

actually play the first law against the

505

00:22:32,710 --> 00:22:36,460

second if you can if you can demonstrate

506

00:22:34,599 --> 00:22:38,500

the other work cycle that creates work

507

00:22:36,460 --> 00:22:39,880

there are two places the system can get

508

00:22:38,500 --> 00:22:41,589

work you can get it from internal energy

509

00:22:39,880 --> 00:22:44,920

or can get it from it can get it from

510

00:22:41,589 --> 00:22:46,179

heat and if you if you track all this

511

00:22:44,920 --> 00:22:47,440

around you find that it has to come from

512

00:22:46,180 --> 00:22:54,789

heap because there's no other no other

513

00:22:47,440 --> 00:22:56,890

place for it to come really yes that's a

514
00:22:54,789 --> 00:23:00,009
good let's start with that idea okay so

515
00:22:56,890 --> 00:23:01,570
let's let's say we had a series of

516
00:23:00,009 --> 00:23:03,910
second law violators and enough to fit

517
00:23:01,569 --> 00:23:05,769
into a can size of a coffee can if you

518
00:23:03,910 --> 00:23:07,450
were to draw in air from one side at

519
00:23:05,769 --> 00:23:09,099
about five meters a second and then and

520
00:23:07,450 --> 00:23:11,380
then cool the air as it comes to and

521
00:23:09,099 --> 00:23:13,779
loses its the air loses heat of let's

522
00:23:11,380 --> 00:23:15,640
say 10 or 15 degrees on this generator

523
00:23:13,779 --> 00:23:18,700
would produce probably about if you

524
00:23:15,640 --> 00:23:20,440
couple kilowatts of power so you could

525
00:23:18,700 --> 00:23:21,789
basically run a typical us household on

526
00:23:20,440 --> 00:23:24,549
average with something about the size of

527
00:23:21,789 --> 00:23:27,399
a can so what would happen is that it

528
00:23:24,549 --> 00:23:29,369
would draw air in from the room crew it

529
00:23:27,400 --> 00:23:31,900
turn that that heat into electricity

530
00:23:29,369 --> 00:23:34,509
that electricity would be distributed to

531
00:23:31,900 --> 00:23:36,759
the computers to the ovens to the TV

532
00:23:34,509 --> 00:23:39,400
sets to everything else which ultimately

533
00:23:36,759 --> 00:23:41,230
turns up is heat and therefore would

534
00:23:39,400 --> 00:23:42,940
come back into the room so aside from

535
00:23:41,230 --> 00:23:46,170
the initial startup of just a little bit

536
00:23:42,940 --> 00:23:48,279
of cooling your room runs basically

537
00:23:46,170 --> 00:23:51,130
perpetually by just on its own heat

538
00:23:48,279 --> 00:23:54,000
recycling it your air conditioner runs

539
00:23:51,130 --> 00:23:57,000
the rest of your house that's right yeah

540
00:23:54,000 --> 00:23:57,000
York

541
00:23:58,859 --> 00:24:04,629
resources they seem to think that it's

542

00:24:02,549 --> 00:24:06,190
sufficient to demonstrate that you can

543
00:24:04,630 --> 00:24:07,810
produce eat because then you can run a

544
00:24:06,190 --> 00:24:11,410
car no end or something more

545
00:24:07,809 --> 00:24:14,889
sophisticated if your second law

546
00:24:11,410 --> 00:24:18,970
violators are drawing on to produce

547
00:24:14,890 --> 00:24:22,150
their motion burning image is not going

548
00:24:18,970 --> 00:24:25,029
to be very useful so how do you plan to

549
00:24:22,150 --> 00:24:27,600
get any energy out of this astronomical

550
00:24:25,029 --> 00:24:27,599
number

551
00:24:30,950 --> 00:24:37,500
right this this in principle this can be

552
00:24:33,900 --> 00:24:39,240
written series of parallel to to build

553
00:24:37,500 --> 00:24:41,789
applied your current advantages in

554
00:24:39,240 --> 00:24:43,920
principle you could your various ways an

555
00:24:41,789 --> 00:24:45,210
extract of taking this mechanical energy

556
00:24:43,920 --> 00:24:46,769

and transducing it you can use piezo

557

00:24:45,210 --> 00:24:48,650
electrics you could use faraday

558

00:24:46,769 --> 00:24:50,730
induction their various ideas for that

559

00:24:48,650 --> 00:24:52,800
but there are other other ways of

560

00:24:50,730 --> 00:24:54,150
exploiting this these potential

561

00:24:52,799 --> 00:24:55,980
differences to you can use them to drive

562

00:24:54,150 --> 00:24:57,180
a lot of chemical reactions so in

563

00:24:55,980 --> 00:24:58,980
principle you could you could have gas

564

00:24:57,180 --> 00:25:00,150
phase I on a chemical reactions which

565

00:24:58,980 --> 00:25:01,920
are being driven and so you could just

566

00:25:00,150 --> 00:25:04,769
have a small Power Cell here recycles

567

00:25:01,920 --> 00:25:06,420
chemicals through using these electric

568

00:25:04,769 --> 00:25:08,039
fields to build a pyre energy chemical

569

00:25:06,420 --> 00:25:10,019
products which are then burnt and then

570

00:25:08,039 --> 00:25:11,129
create electricity that way so in that

571
00:25:10,019 --> 00:25:12,569
sense you wouldn't even have to build

572
00:25:11,130 --> 00:25:14,970
microscopic devices you can post only

573
00:25:12,569 --> 00:25:16,889
macroscopic basically a specialized

574
00:25:14,970 --> 00:25:18,420
catalyst so this is mainly for

575
00:25:16,890 --> 00:25:19,920
demonstration purposes this is something

576
00:25:18,420 --> 00:25:21,300
that could be tested and demonstrate the

577
00:25:19,920 --> 00:25:23,210
principle and there will be a lot of

578
00:25:21,299 --> 00:25:25,529
environment so that I suspect I presume

579
00:25:23,210 --> 00:25:38,910
could we get you to swap these and all

580
00:25:25,529 --> 00:25:42,450
yesterday I have a question yes I'll be

581
00:25:38,910 --> 00:25:47,460
so zero point energy systems predicated

582
00:25:42,450 --> 00:25:49,529
upon closed systems or open systems over

583
00:25:47,460 --> 00:25:52,350
there are based on closed system where

584
00:25:49,529 --> 00:25:59,339
is an example of closed system and if

585
00:25:52,349 --> 00:26:02,369
they are based an open system how I

586
00:25:59,339 --> 00:26:04,919
thought of a captain nope or give a

587
00:26:02,369 --> 00:26:07,379
second law devices at this point I yeah

588
00:26:04,920 --> 00:26:08,340
but I mean yeah also O'Gara can probe

589
00:26:07,380 --> 00:26:11,640
dirty could probably answer that

590
00:26:08,339 --> 00:26:14,359
question well discussion zero-point

591
00:26:11,640 --> 00:26:16,340
energy casa para show

592
00:26:14,359 --> 00:26:18,740
upon a gradient that exists in nature

593
00:26:16,339 --> 00:26:20,359
that is the difference between me zero

594
00:26:18,740 --> 00:26:21,980
point energy outside Casper Academy this

595
00:26:20,359 --> 00:26:24,019
stuff it's very different dad's talking

596
00:26:21,980 --> 00:26:25,849
about I think we finally finishing this

597
00:26:24,019 --> 00:26:28,369
custom second law before you answer to

598
00:26:25,849 --> 00:26:31,879
discussion about internal energy but

599

00:26:28,369 --> 00:26:36,649
everything thermal energy going

600
00:26:31,880 --> 00:26:38,750
someplace and that must be believed

601
00:26:36,650 --> 00:26:44,560
no it's nothing to do it

602
00:26:38,750 --> 00:26:44,559
it is good way to jalapenos

603
00:26:46,720 --> 00:26:52,220
boiling of water well it dissipates into

604
00:26:50,538 --> 00:26:59,950
the environment in a way that we just

605
00:26:52,220 --> 00:27:03,319
don't recognize where it goes well it

606
00:26:59,950 --> 00:27:06,620
within our system here that the earth

607
00:27:03,319 --> 00:27:08,240
radiates heat out into space on the dark

608
00:27:06,619 --> 00:27:14,599
side of the planet when the Sun isn't

609
00:27:08,240 --> 00:27:16,970
shining light no no not really no the

610
00:27:14,599 --> 00:27:20,719
earth is actually a giant here a giant

611
00:27:16,970 --> 00:27:24,259
heat engine if you want to look at 0

612
00:27:20,720 --> 00:27:29,750
plan or geo resources they were then for

613
00:27:24,259 --> 00:27:31,788

boggy he's dissipated it it diffuses

614

00:27:29,750 --> 00:27:34,099
into out into the solar system in

615

00:27:31,788 --> 00:27:36,859
universe where is that distant points in

616

00:27:34,099 --> 00:27:38,538
our galaxy we can look and some other

617

00:27:36,859 --> 00:27:40,038
intelligent being can look this way and

618

00:27:38,538 --> 00:27:42,200
say oh I see a fair amount of infrared

619

00:27:40,038 --> 00:27:46,599
energy coming off those planets by this

620

00:27:42,200 --> 00:27:54,380
star we call the sign here so it's it

621

00:27:46,599 --> 00:27:56,569
sure sure it's legitimate that's allow

622

00:27:54,380 --> 00:27:59,150
me to cool the only discussion first

623

00:27:56,569 --> 00:28:02,089
second yep if anybody in the audience

624

00:27:59,150 --> 00:28:04,370
has not picked up a package of sse

625

00:28:02,089 --> 00:28:07,879
business cards give your friends and

626

00:28:04,369 --> 00:28:11,500
neighbors i've got a few left so please

627

00:28:07,880 --> 00:28:17,330
come see me if you haven't picked one up

628
00:28:11,500 --> 00:28:21,880
hang on hang on I'm not done my biggest

629
00:28:17,329 --> 00:28:25,460
concern with all of this is the

630
00:28:21,880 --> 00:28:28,520
emotional political influence on good

631
00:28:25,460 --> 00:28:30,470
science that is to a large extent

632
00:28:28,519 --> 00:28:33,589
ripping this country and the rest of the

633
00:28:30,470 --> 00:28:37,610
world apart Spain is going broke because

634
00:28:33,589 --> 00:28:42,019
they invested heavily in windmills acres

635
00:28:37,609 --> 00:28:47,329
and square miles of photovoltaic oval

636
00:28:42,019 --> 00:28:49,639
take energy systems are stupid what I

637
00:28:47,329 --> 00:28:52,129
expect to happen is we'll have all the

638
00:28:49,640 --> 00:28:55,580
deserts covered with photocells and

639
00:28:52,130 --> 00:28:57,500
windmills on every corner and then cold

640
00:28:55,579 --> 00:28:59,240
fusion will go commercial

641
00:28:57,500 --> 00:29:01,400
will be the end of it well another thing

642

00:28:59,240 --> 00:29:03,140
will what another thing will stall the

643

00:29:01,400 --> 00:29:05,360
wind and solar is that we still haven't

644

00:29:03,140 --> 00:29:09,080
solved the storage problem of nights and

645

00:29:05,359 --> 00:29:10,549
storm buddy well when we draw on some of

646

00:29:09,079 --> 00:29:13,009
the expertise in the audience what where

647

00:29:10,549 --> 00:29:14,720
do you see sociologically what do you

648

00:29:13,009 --> 00:29:16,940
think the ramifications would be of a

649

00:29:14,720 --> 00:29:18,470
breakthrough in this is it would it be

650

00:29:16,940 --> 00:29:21,799
ignored would it be embraced would it be

651

00:29:18,470 --> 00:29:23,660
squashed with you that's a really good

652

00:29:21,799 --> 00:29:29,569
question I wanted to dance ask that all

653

00:29:23,660 --> 00:29:32,600
day today I in the classes I have a Utah

654

00:29:29,569 --> 00:29:36,710
Valley University I teach about you know

655

00:29:32,599 --> 00:29:38,869
these kinds of a zero-point field and

656

00:29:36,710 --> 00:29:41,029
all of these different things to get

657
00:29:38,869 --> 00:29:42,849
energy and the question I asked because

658
00:29:41,029 --> 00:29:47,539
one of them asked that very question

659
00:29:42,849 --> 00:29:52,339
what are the sociological ramifications

660
00:29:47,539 --> 00:29:55,490
of being successful and we make that a

661
00:29:52,339 --> 00:29:56,990
group project to decide what would be

662
00:29:55,490 --> 00:29:59,839
the things one of the one of the thought

663
00:29:56,990 --> 00:30:05,180
experiments is suppose you do get good

664
00:29:59,839 --> 00:30:06,919
clean energy unlimited what walk down

665
00:30:05,180 --> 00:30:10,220
the street or drive down the street and

666
00:30:06,920 --> 00:30:12,980
say what would still be there and what

667
00:30:10,220 --> 00:30:15,350
would be gone and so that's a very good

668
00:30:12,980 --> 00:30:19,339
question what most of the things that

669
00:30:15,349 --> 00:30:20,869
they say is everybody's going to lose

670
00:30:19,339 --> 00:30:22,759

their job and that's the thing that

671

00:30:20,869 --> 00:30:25,219

they're worried about course now they're

672

00:30:22,759 --> 00:30:27,529

speaking from half of them not having a

673

00:30:25,220 --> 00:30:29,450

job at the present time that's right

674

00:30:27,529 --> 00:30:31,549

well that was a case with the origin

675

00:30:29,450 --> 00:30:33,559

carriage and disagree with you deal you

676

00:30:31,549 --> 00:30:35,119

can look closer far all right Kim I'm

677

00:30:33,559 --> 00:30:37,039

sorry yeah it's a wee front through that

678

00:30:35,119 --> 00:30:39,439

situation time and time again with the

679

00:30:37,039 --> 00:30:40,789

evolution of society just a hundred

680

00:30:39,440 --> 00:30:43,070

years ago the horse and carriage

681

00:30:40,789 --> 00:30:45,740

industry when essentially closed their

682

00:30:43,069 --> 00:30:47,119

business one tenth of what it was at the

683

00:30:45,740 --> 00:30:48,980

introduction of the automobile yet

684

00:30:47,119 --> 00:30:51,619

history recounts no losers of people

685
00:30:48,980 --> 00:30:53,029
being left behind and how about say six

686
00:30:51,619 --> 00:30:55,129
hundred years ago when I pane glass

687
00:30:53,029 --> 00:30:57,139
windows were invented and that the

688
00:30:55,130 --> 00:31:00,560
candle makers guild were put out of

689
00:30:57,140 --> 00:31:02,210
business history recounts no losers

690
00:31:00,559 --> 00:31:04,759
there they just had to change their

691
00:31:02,210 --> 00:31:06,710
careers right and but you can

692
00:31:04,759 --> 00:31:08,720
but you can see short-term problems

693
00:31:06,710 --> 00:31:11,960
certainly I mean if you were to let's

694
00:31:08,720 --> 00:31:13,670
say if a burn Ian and Garrett are

695
00:31:11,960 --> 00:31:16,100
successful and they can create let's say

696
00:31:13,670 --> 00:31:18,019
a handheld device that can put out five

697
00:31:16,099 --> 00:31:19,819
kilowatts of power or one of our devices

698
00:31:18,019 --> 00:31:22,089
second our devices ken's or someone

699
00:31:19,819 --> 00:31:25,869
else's does the same you could basically

700
00:31:22,089 --> 00:31:29,240
unplug almost a commercial buildings and

701
00:31:25,869 --> 00:31:30,829
it houses all residential from the grid

702
00:31:29,240 --> 00:31:33,289
you would you would do away with the oil

703
00:31:30,829 --> 00:31:35,299
and gas industry you would see the

704
00:31:33,289 --> 00:31:37,099
influence of the mideast disappeared

705
00:31:35,299 --> 00:31:40,119
those they would disappear back into the

706
00:31:37,099 --> 00:31:42,079
sands on it would it would destabilize

707
00:31:40,119 --> 00:31:44,959
geopolitically large parts of the world

708
00:31:42,079 --> 00:31:46,839
Russia would loses influence with with

709
00:31:44,960 --> 00:31:49,370
its gas production over Western Europe

710
00:31:46,839 --> 00:31:51,169
well how the holiday regain their

711
00:31:49,369 --> 00:31:52,250
stature if they don't have an economical

712
00:31:51,170 --> 00:31:54,980
ever would they have with you become

713

00:31:52,250 --> 00:31:57,710
military there be all sorts of very

714
00:31:54,980 --> 00:31:58,940
profound changes at the same time you

715
00:31:57,710 --> 00:32:00,920
would he would you you could possibly

716
00:31:58,940 --> 00:32:02,390
lower if you had unlimited amounts of

717
00:32:00,920 --> 00:32:04,759
energy available to you you could start

718
00:32:02,390 --> 00:32:06,980
making co2 scrubbers bring the co2 back

719
00:32:04,759 --> 00:32:11,420
down 270 parts per million rather than

720
00:32:06,980 --> 00:32:14,210
380 where it is now you could forestall

721
00:32:11,420 --> 00:32:16,730
a global warming cool the oceans you do

722
00:32:14,210 --> 00:32:18,440
all sorts of things clean water you

723
00:32:16,730 --> 00:32:20,089
would if you could purify water or

724
00:32:18,440 --> 00:32:21,140
simply condense it out of the air you

725
00:32:20,089 --> 00:32:22,429
would solve though you know an average

726
00:32:21,140 --> 00:32:24,410
person in the world spends two or three

727
00:32:22,430 --> 00:32:26,090

hours in poor countries looking for

728

00:32:24,410 --> 00:32:28,160

water every day you transform everything

729

00:32:26,089 --> 00:32:29,029

good and bad but certainly be disruptive

730

00:32:28,160 --> 00:32:30,740

and I can't think of anything more

731

00:32:29,029 --> 00:32:33,079

disruptive than changing the way energy

732

00:32:30,740 --> 00:32:35,720

is produced and once energy becomes free

733

00:32:33,079 --> 00:32:37,549

we can solve the water crises in many

734

00:32:35,720 --> 00:32:39,740

places the world and the food run albums

735

00:32:37,549 --> 00:32:41,990

to write energies behind everything

736

00:32:39,740 --> 00:32:43,670

closer to shirt on your back well every

737

00:32:41,990 --> 00:32:45,740

every every spoonful of food you put

738

00:32:43,670 --> 00:32:47,210

into your mouth has roughly 20 grams of

739

00:32:45,740 --> 00:32:49,460

petroleum behind it in terms of

740

00:32:47,210 --> 00:32:50,779

transportation costs fertilizer or

741

00:32:49,460 --> 00:32:52,640

grilling costs and all that so you're

742
00:32:50,779 --> 00:32:54,349
putting 20 grams of oil into your mouth

743
00:32:52,640 --> 00:32:58,490
every time you take a spoonful of food

744
00:32:54,349 --> 00:33:01,549
it's just it's tremendous places where

745
00:32:58,490 --> 00:33:03,349
the energy goes that's all right my name

746
00:33:01,549 --> 00:33:06,069
is John ran with open minds and open

747
00:33:03,349 --> 00:33:09,339
minds TV

748
00:33:06,069 --> 00:33:11,679
there's a couple of energy sources that

749
00:33:09,339 --> 00:33:15,909
I wanted you to be aware of one of them

750
00:33:11,680 --> 00:33:20,980
was a patent by jaeger lecoultre they

751
00:33:15,910 --> 00:33:24,610
invented an Atmos clock and an atlas

752
00:33:20,980 --> 00:33:27,730
clock using a accordion type cylinder

753
00:33:24,609 --> 00:33:31,119
which expanded and contracted with

754
00:33:27,730 --> 00:33:34,829
temperature changes one of those little

755
00:33:31,119 --> 00:33:38,769
cylinders the size of the size of a

756
00:33:34,829 --> 00:33:40,990
teacup can actually lift a human being

757
00:33:38,769 --> 00:33:44,769
just by changing the temperature with a

758
00:33:40,990 --> 00:33:47,259
little can of air spray that that was

759
00:33:44,769 --> 00:33:50,740
called a perpetual clock and that

760
00:33:47,259 --> 00:33:56,019
technology exists the other one is using

761
00:33:50,740 --> 00:34:00,430
solar park xerox a year ago came out

762
00:33:56,019 --> 00:34:03,700
with a new type of a satellite it looked

763
00:34:00,430 --> 00:34:08,289
like a second dish but it focused a beam

764
00:34:03,700 --> 00:34:10,780
to to a type of element which was 100

765
00:34:08,289 --> 00:34:13,539
times more efficient than anything that

766
00:34:10,780 --> 00:34:17,200
we have in solar cells that patent was

767
00:34:13,539 --> 00:34:20,320
sold for over 100 million dollars last

768
00:34:17,199 --> 00:34:23,230
year I couldn't get the the type of

769
00:34:20,320 --> 00:34:26,050
material it used but that's uh that's

770

00:34:23,230 --> 00:34:28,809
probably one of the interesting things

771
00:34:26,050 --> 00:34:31,930
about the solar panel another one is the

772
00:34:28,809 --> 00:34:35,559
bloom box these boom boxes are appearing

773
00:34:31,929 --> 00:34:38,409
in front of google and ebay and a

774
00:34:35,559 --> 00:34:41,289
tremendous amount of energy output for a

775
00:34:38,409 --> 00:34:43,949
very small amount of resources going in

776
00:34:41,289 --> 00:34:47,920
almost working on almost any type of

777
00:34:43,949 --> 00:34:49,869
fuel are any of you aware of this year

778
00:34:47,920 --> 00:34:51,519
all of those are free energy sources

779
00:34:49,869 --> 00:34:53,049
though they all require free energy

780
00:34:51,519 --> 00:34:54,670
they're not going to store more

781
00:34:53,050 --> 00:34:56,260
efficient maybe but they're not the

782
00:34:54,670 --> 00:34:59,170
bloom back city is talking about is

783
00:34:56,260 --> 00:35:01,150
actually a very successful commercial

784
00:34:59,170 --> 00:35:02,710

fuel cell but they're still there's

785

00:35:01,150 --> 00:35:04,389

still a fuel cell I know that's right

786

00:35:02,710 --> 00:35:06,159

now so I think there's still some where

787

00:35:04,389 --> 00:35:08,199

around sixty percent efficiency and

788

00:35:06,159 --> 00:35:10,460

forty percent test to be discharged as

789

00:35:08,199 --> 00:35:13,069

heat into the environment I mean it

790

00:35:10,460 --> 00:35:14,030

comment2 about the solar concentrating

791

00:35:13,070 --> 00:35:16,130

solar cause you no good whatsoever

792

00:35:14,030 --> 00:35:18,440

because you only have so much watts per

793

00:35:16,130 --> 00:35:20,180

square meter and that's that's it in

794

00:35:18,440 --> 00:35:22,510

concentrate if you want to and they have

795

00:35:20,179 --> 00:35:24,829

some effect on the efficiency of the

796

00:35:22,510 --> 00:35:26,900

conversion but you're limited by the

797

00:35:24,829 --> 00:35:28,039

amount of the solar energy coming per

798

00:35:26,900 --> 00:35:30,588

square meter you can't do anything about

799

00:35:28,039 --> 00:35:33,650
that move the earth closer to the Sun

800

00:35:30,588 --> 00:35:35,599
you by the way that clock they're

801

00:35:33,650 --> 00:35:37,670
talking about that operates with the

802

00:35:35,599 --> 00:35:39,650
bellows is just simply it's a heat

803

00:35:37,670 --> 00:35:42,019
engine that operates over a day long

804

00:35:39,650 --> 00:35:44,750
cycle of absorbing heat and getting rid

805

00:35:42,019 --> 00:35:48,530
of heat that concept of centuries-old

806

00:35:44,750 --> 00:35:53,750
actually um my name is John rhythm the

807

00:35:48,530 --> 00:35:56,480
treasure of SSC comment and question is

808

00:35:53,750 --> 00:35:59,210
this we've been discussing a new energy

809

00:35:56,480 --> 00:36:02,809
sources and it's it seems like the focus

810

00:35:59,210 --> 00:36:05,300
has been on rather exotic and the

811

00:36:02,809 --> 00:36:10,099
sources such as the cpe Casimir effect

812

00:36:05,300 --> 00:36:15,609
and others I'm wondering and if if you

813
00:36:10,099 --> 00:36:18,289
could tell the audience if there's any

814
00:36:15,608 --> 00:36:21,170
very revolutionary research being done

815
00:36:18,289 --> 00:36:23,570
on fuels that can be used in

816
00:36:21,170 --> 00:36:25,550
conventional engines that already exist

817
00:36:23,570 --> 00:36:28,700
and are being used worldwide such as

818
00:36:25,550 --> 00:36:32,030
internal combustion engines and an

819
00:36:28,699 --> 00:36:34,669
especially fuels like the use of

820
00:36:32,030 --> 00:36:36,970
hydrogen which the Germans were using in

821
00:36:34,670 --> 00:36:40,070
World War two when they didn't have

822
00:36:36,969 --> 00:36:43,699
petroleum sources of fuel to operate

823
00:36:40,070 --> 00:36:46,390
their combustion engine so it do you

824
00:36:43,699 --> 00:36:51,759
have any research is being done on

825
00:36:46,389 --> 00:36:55,960
methods of hydrolysis of water or other

826
00:36:51,760 --> 00:36:59,570
such you know fairly freely available

827

00:36:55,960 --> 00:37:02,179
substances that we have so that the that

828
00:36:59,570 --> 00:37:04,820
it could produce essentially a free

829
00:37:02,179 --> 00:37:07,250
source of energy by mate because the

830
00:37:04,820 --> 00:37:10,070
source of the fuel would be so cheap but

831
00:37:07,250 --> 00:37:11,869
could through hydrolysis have a source

832
00:37:10,070 --> 00:37:13,820
of hydrogen that could go into the

833
00:37:11,869 --> 00:37:15,200
internal combustion engines and and

834
00:37:13,820 --> 00:37:17,059
operate

835
00:37:15,199 --> 00:37:18,769
you know with conventional technology

836
00:37:17,059 --> 00:37:21,679
without some of the exotics that we've

837
00:37:18,769 --> 00:37:25,190
been discussing I just I think number of

838
00:37:21,679 --> 00:37:28,909
us will give you responses one I like a

839
00:37:25,190 --> 00:37:33,849
lot is an air powered car something

840
00:37:28,909 --> 00:37:39,739
that's been worked on connect a french

841
00:37:33,849 --> 00:37:42,200

engineer for quite a long time and my

842

00:37:39,739 --> 00:37:44,059

thermodynamics class we actually started

843

00:37:42,199 --> 00:37:47,539

off the class by doing an analysis of

844

00:37:44,059 --> 00:37:51,230

his engine and see how much energy you

845

00:37:47,539 --> 00:37:54,800

can get and it's very small but it's

846

00:37:51,230 --> 00:37:59,539

actually practical and he's now building

847

00:37:54,800 --> 00:38:02,000

these in tanta the Indian today our car

848

00:37:59,539 --> 00:38:04,070

maker has contracted with in there

849

00:38:02,000 --> 00:38:06,469

apparently in production for these

850

00:38:04,070 --> 00:38:12,559

air-powered cars they do think of have a

851

00:38:06,469 --> 00:38:14,629

fuel backup as well that's one minor you

852

00:38:12,559 --> 00:38:16,849

get a little bit more mileage afib used

853

00:38:14,630 --> 00:38:18,769

a store liquid nitrogen on board as

854

00:38:16,849 --> 00:38:20,869

opposed to just compressed air because

855

00:38:18,769 --> 00:38:24,530

then you can enlist thermal energy to

856
00:38:20,869 --> 00:38:26,000
boil for the In2 I would think it

857
00:38:24,530 --> 00:38:27,769
puzzles me is why we don't make more use

858
00:38:26,000 --> 00:38:29,750
of the same technologies being used in

859
00:38:27,769 --> 00:38:32,690
Brazil instead of using corn to make

860
00:38:29,750 --> 00:38:34,519
ethanol there's very not very very

861
00:38:32,690 --> 00:38:36,079
efficient and clear but they're actually

862
00:38:34,519 --> 00:38:37,400
gaining anything by doing that why are

863
00:38:36,079 --> 00:38:38,450
we not using sugar cane which is about

864
00:38:37,400 --> 00:38:40,280
competitive

865
00:38:38,449 --> 00:38:46,098
vision it's made Latrell pretty much

866
00:38:40,280 --> 00:38:48,260
energy okay then i would say that even

867
00:38:46,099 --> 00:38:50,000
if you could find these fuels your

868
00:38:48,260 --> 00:38:51,440
there's still free energy sources which

869
00:38:50,000 --> 00:38:53,960
have an efficiency associated with them

870
00:38:51,440 --> 00:38:56,329
which is thermodynamically mandated and

871
00:38:53,960 --> 00:38:58,429
so if you can improve your efficiency by

872
00:38:56,329 --> 00:39:00,230
ten percent fine then you drive an SUV

873
00:38:58,429 --> 00:39:02,828
which uses twenty percent more gas as a

874
00:39:00,230 --> 00:39:05,179
result in you're simply behind the curve

875
00:39:02,829 --> 00:39:08,180
even the way energy is being used right

876
00:39:05,179 --> 00:39:12,139
now and the demand for it there will not

877
00:39:08,179 --> 00:39:14,118
be enough by the conventional sources or

878
00:39:12,139 --> 00:39:15,769
even the ones or anything like the

879
00:39:14,119 --> 00:39:17,269
conventional sources and if we use them

880
00:39:15,769 --> 00:39:27,829
as we are currently using will destroy

881
00:39:17,269 --> 00:39:29,420
the planet that's right 200 yes okay let

882
00:39:27,829 --> 00:39:32,060
me out let me address that directly yeah

883
00:39:29,420 --> 00:39:34,190
if you tip if you want to break if you

884

00:39:32,059 --> 00:39:35,659
want to if you want to break water down

885
00:39:34,190 --> 00:39:37,429
into hydrogen and oxygen it requires

886
00:39:35,659 --> 00:39:39,559
energy to do so which means you have to

887
00:39:37,429 --> 00:39:40,730
provide that electrical energy and that

888
00:39:39,559 --> 00:39:42,230
electrical energy would come from the

889
00:39:40,730 --> 00:39:43,818
burning of coal or gas or oil or

890
00:39:42,230 --> 00:39:45,318
something else and that in itself is

891
00:39:43,818 --> 00:39:47,599
going to be inefficient and then you go

892
00:39:45,318 --> 00:39:49,099
through the extra step of breaking down

893
00:39:47,599 --> 00:39:51,109
the gas and you have to pressurize

894
00:39:49,099 --> 00:39:52,190
accrue it all of that in the end it

895
00:39:51,108 --> 00:39:53,809
doesn't do you any good all does is

896
00:39:52,190 --> 00:39:55,760
remove the pollution source from one

897
00:39:53,809 --> 00:39:58,420
place to another but but it doesn't get

898
00:39:55,760 --> 00:39:58,420

you any net energy

899

00:40:23,230 --> 00:40:28,510

okay sure if you if you if you use the

900

00:40:26,289 --> 00:40:30,599

catalyst interview to question the and

901

00:40:28,510 --> 00:40:33,310

your if are there any are there any

902

00:40:30,599 --> 00:40:34,779

breakthroughs breakthroughs that can be

903

00:40:33,309 --> 00:40:37,029

used with conventional energy sources

904

00:40:34,780 --> 00:40:39,550

for instance electrolysis of water let's

905

00:40:37,030 --> 00:40:41,680

say catalogs breakdown of it yes the

906

00:40:39,550 --> 00:40:43,330

catalysts don't shift the equilibrium

907

00:40:41,679 --> 00:40:45,460

they don't they don't give you any extra

908

00:40:43,329 --> 00:40:46,779

or any free energy so you're still going

909

00:40:45,460 --> 00:40:47,980

to have to pay the energy costs of

910

00:40:46,780 --> 00:40:49,570

breaking it down you might be able to do

911

00:40:47,980 --> 00:40:51,159

it more efficiently more quickly you can

912

00:40:49,570 --> 00:40:52,269

lower the activation energy for doing so

913
00:40:51,159 --> 00:40:54,250
you're not going to change the actual

914
00:40:52,269 --> 00:40:57,730
energy costs in doing so so you're just

915
00:40:54,250 --> 00:40:59,829
adding to that you know there if you

916
00:40:57,730 --> 00:41:02,469
look online you'll find a number of

917
00:40:59,829 --> 00:41:04,779
water powered cars yes I was about to

918
00:41:02,469 --> 00:41:07,449
say we need to address that i stand here

919
00:41:04,780 --> 00:41:09,430
saying that as rush i do took you you

920
00:41:07,449 --> 00:41:12,250
can you can look at a person farming

921
00:41:09,429 --> 00:41:14,559
table for water and just as daniel said

922
00:41:12,250 --> 00:41:16,480
you know no matter how you get from here

923
00:41:14,559 --> 00:41:19,150
to there there's just a certain amount

924
00:41:16,480 --> 00:41:22,659
of energy involved in in the bonding

925
00:41:19,150 --> 00:41:24,460
process and we can't change that now it

926
00:41:22,659 --> 00:41:27,969
may be possible that adding water

927
00:41:24,460 --> 00:41:29,920
gasoline improves Oh yo stepped out

928
00:41:27,969 --> 00:41:32,459
religions that's been demonstrated him

929
00:41:29,920 --> 00:41:36,400
statuses and that's been demonstrated

930
00:41:32,460 --> 00:41:38,949
but there are there let me tell you one

931
00:41:36,400 --> 00:41:41,530
that actually does work and excuse me

932
00:41:38,949 --> 00:41:42,879
Olga was in my class for quoting

933
00:41:41,530 --> 00:41:46,150
something else from the class that was

934
00:41:42,880 --> 00:41:49,510
we were thinking what happens if you

935
00:41:46,150 --> 00:41:52,500
take water and you evaporate it that

936
00:41:49,510 --> 00:41:54,910
will cool that will give you

937
00:41:52,500 --> 00:41:58,900
cult which is the opposite of a female

938
00:41:54,909 --> 00:42:01,000
my guest yes and then you use that with

939
00:41:58,900 --> 00:42:03,369
a Stirling engine or some some attention

940
00:42:01,000 --> 00:42:04,989
and you use the cold that you jam it

941

00:42:03,369 --> 00:42:07,420
doesn't matter if you put heat in or

942
00:42:04,989 --> 00:42:11,649
take it out it's still flow that's all

943
00:42:07,420 --> 00:42:17,860
right I just want to oh so let's say

944
00:42:11,650 --> 00:42:20,680
that you sew into it you make you make a

945
00:42:17,860 --> 00:42:23,289
gradient so you've got cold and eat and

946
00:42:20,679 --> 00:42:24,849
you use that to drive a Stirling engine

947
00:42:23,289 --> 00:42:27,009
or something like that could you

948
00:42:24,849 --> 00:42:29,799
actually end up with a net energy game

949
00:42:27,010 --> 00:42:31,990
and the answer is yes you actually could

950
00:42:29,800 --> 00:42:34,060
build a motor that would work like this

951
00:42:31,989 --> 00:42:35,799
so then we did the calculation how much

952
00:42:34,059 --> 00:42:38,829
water would you need compared with

953
00:42:35,800 --> 00:42:40,720
gasoline so if you had a car running

954
00:42:38,829 --> 00:42:41,829
around instead of having a gas tank you

955
00:42:40,719 --> 00:42:44,049

at a water tank which you've evaporated

956

00:42:41,829 --> 00:42:47,650

it turns out it's about a factor of 100

957

00:42:44,050 --> 00:42:50,080

more than you need for gasoline so it

958

00:42:47,650 --> 00:42:56,050

really is not practical for a car engine

959

00:42:50,079 --> 00:42:58,170

however for a boat I don't know hello

960

00:42:56,050 --> 00:43:00,250

it's left if I to follow up on that

961

00:42:58,170 --> 00:43:02,710

exactly you're just saying first of all

962

00:43:00,250 --> 00:43:05,769

I appreciate the comment by Dan about

963

00:43:02,710 --> 00:43:07,630

efficiency that just getting more energy

964

00:43:05,769 --> 00:43:09,099

isn't going to change our consumption of

965

00:43:07,630 --> 00:43:11,920

it we do also have to focus on being

966

00:43:09,099 --> 00:43:12,909

efficient and using it well if we're

967

00:43:11,920 --> 00:43:16,809

going to ever solve the underlying

968

00:43:12,909 --> 00:43:18,460

problem but I just have this idea in and

969

00:43:16,809 --> 00:43:20,559

I it's not my fluid extra peat expertise

970
00:43:18,460 --> 00:43:24,150
so maybe I'll sound stupid but it's a

971
00:43:20,559 --> 00:43:26,559
good idea I don't when we burn gasoline

972
00:43:24,150 --> 00:43:29,139
it's a very primitive way of extracting

973
00:43:26,559 --> 00:43:30,730
the energy from the gasoline not cool or

974
00:43:29,139 --> 00:43:33,579
burning wood or things like that is

975
00:43:30,730 --> 00:43:36,969
other ways to perform the same chemical

976
00:43:33,579 --> 00:43:38,829
reactions in very efficient ways that

977
00:43:36,969 --> 00:43:40,509
are not called burning that sure you

978
00:43:38,829 --> 00:43:41,860
just make fuel cells for instance which

979
00:43:40,510 --> 00:43:44,290
would be highly efficient you know sixty

980
00:43:41,860 --> 00:43:46,210
eighty percent efficient I assume where

981
00:43:44,289 --> 00:43:48,219
you're you're not having to go through a

982
00:43:46,210 --> 00:43:51,670
work cycle in the same way yeah you can

983
00:43:48,219 --> 00:43:53,980
you could make ya a la hydrogen oxygen

984
00:43:51,670 --> 00:43:55,750
fuel cell is theoretically eighty-six

985
00:43:53,980 --> 00:43:57,969
percent efficient yeah but I'm

986
00:43:55,750 --> 00:44:00,789
suggesting literally breaking down the

987
00:43:57,969 --> 00:44:01,379
same gasoline molecules so if you use

988
00:44:00,789 --> 00:44:03,509
the same few

989
00:44:01,380 --> 00:44:05,760
and it doesn't produce a gaseous co2 and

990
00:44:03,510 --> 00:44:08,220
we can capture the carbon and because

991
00:44:05,760 --> 00:44:09,450
it's some kind of digestive process well

992
00:44:08,219 --> 00:44:11,579
sure if you could find a way to capture

993
00:44:09,449 --> 00:44:14,250
the carbon and as co2 sure that'd be

994
00:44:11,579 --> 00:44:16,139
great it's sequester it I assume that be

995
00:44:14,250 --> 00:44:17,849
possible sure well it's a lesson has to

996
00:44:16,139 --> 00:44:19,679
be gashes the real question is modeling

997
00:44:17,849 --> 00:44:21,239
you know our energy sources off of the

998

00:44:19,679 --> 00:44:22,469
way we digest food in the way that you

999
00:44:21,239 --> 00:44:24,629
know those chemical reactions happen

1000
00:44:22,469 --> 00:44:25,919
rather than burning as a fundamental but

1001
00:44:24,630 --> 00:44:27,960
I think fuel cell is probably one of the

1002
00:44:25,920 --> 00:44:30,690
best ways to go on up yes our muscles

1003
00:44:27,960 --> 00:44:33,000
are actually about 80 our muscles are

1004
00:44:30,690 --> 00:44:36,300
about thirty percent efficient and

1005
00:44:33,000 --> 00:44:39,329
conversion of hydrocarbons into muscle

1006
00:44:36,300 --> 00:44:41,640
work and yet that's done with much lower

1007
00:44:39,329 --> 00:44:43,469
temperatures than an engine but it's a

1008
00:44:41,639 --> 00:44:45,440
whole different process of tapping that

1009
00:44:43,469 --> 00:44:48,329
energy to Gibbs free energy

1010
00:44:45,440 --> 00:44:57,269
transformation as opposed to a thermal

1011
00:44:48,329 --> 00:45:06,119
one combined it it's it's a battery with

1012
00:44:57,269 --> 00:45:07,710

potentially unlimited reactants yeah

1013

00:45:06,119 --> 00:45:09,569

there are many different types although

1014

00:45:07,710 --> 00:45:11,190

the hydrogen oxygen when is the cleanest

1015

00:45:09,570 --> 00:45:13,590

and the least susceptible to following

1016

00:45:11,190 --> 00:45:16,860

we still haven't solved the problem with

1017

00:45:13,590 --> 00:45:18,240

that dirty carbon-carbon bond place like

1018

00:45:16,860 --> 00:45:20,309

Iceland we have lots of geothermal

1019

00:45:18,239 --> 00:45:21,629

energy you can use that to bring the

1020

00:45:20,309 --> 00:45:23,820

part of the water and hydrogen oxygen

1021

00:45:21,630 --> 00:45:25,500

many values that to run your car's fuel

1022

00:45:23,820 --> 00:45:26,760

cell but you're actually then running

1023

00:45:25,500 --> 00:45:28,068

things off with the diff there whenever

1024

00:45:26,760 --> 00:45:30,549

you coming from

1025

00:45:28,068 --> 00:45:30,548

in Europe

1026

00:45:31,789 --> 00:45:39,230

it sounds like it's time for me to go to

1027
00:45:34,250 --> 00:45:41,210
war on two fronts first Garrett recently

1028
00:45:39,230 --> 00:45:43,760
over the last five years like I worked

1029
00:45:41,210 --> 00:45:45,740
with a man that built air powered cars

1030
00:45:43,760 --> 00:45:49,910
you want to take a guess what a standard

1031
00:45:45,739 --> 00:45:54,529
high pressure gas tank the stand-up tank

1032
00:45:49,909 --> 00:45:58,279
with a screw off top with air at 3,000

1033
00:45:54,530 --> 00:46:01,040
psi what the energy storage value of

1034
00:45:58,280 --> 00:46:02,990
that is the calculations it's very

1035
00:46:01,039 --> 00:46:05,719
little that's one works roughly one

1036
00:46:02,989 --> 00:46:09,079
horsepower ality it's a much lower

1037
00:46:05,719 --> 00:46:13,069
density far lowered as a fuel source

1038
00:46:09,079 --> 00:46:16,429
than gasoline I guess this French

1039
00:46:13,070 --> 00:46:19,730
compressed air vehicle I've watched that

1040
00:46:16,429 --> 00:46:24,440
thing for like five years when you load

1041
00:46:19,730 --> 00:46:26,059
that thing up with 4500 PSI air you

1042
00:46:24,440 --> 00:46:29,510
increase the weight of the vehicle by

1043
00:46:26,059 --> 00:46:32,599
about 750 pounds and if one of those

1044
00:46:29,510 --> 00:46:34,940
tanks ruptures you either have the

1045
00:46:32,599 --> 00:46:38,929
world's most colossal rocket in center

1046
00:46:34,940 --> 00:46:42,050
city or one loud ass explosion yeah okay

1047
00:46:38,929 --> 00:46:43,519
that's what if it's hard it's hard to be

1048
00:46:42,050 --> 00:46:45,050
gasoline I mean when you look at the

1049
00:46:43,519 --> 00:46:46,369
actual chemical energy and gasoline is

1050
00:46:45,050 --> 00:46:48,170
higher when it's burned than high

1051
00:46:46,369 --> 00:46:49,940
explosives literally when you're feeling

1052
00:46:48,170 --> 00:46:51,440
your car up with gasoline you might as

1053
00:46:49,940 --> 00:46:53,630
well be filling it up with with the

1054
00:46:51,440 --> 00:46:54,769
plastique and you're just blowing your

1055

00:46:53,630 --> 00:46:56,030
way down the highway in a series of

1056
00:46:54,769 --> 00:46:59,119
explosions that's tremendously

1057
00:46:56,030 --> 00:47:01,910
energy-intensive right great admiration

1058
00:46:59,119 --> 00:47:07,069
respect for gasoline yeah I always start

1059
00:47:01,909 --> 00:47:08,899
fires with kerosene I Daniel I want to

1060
00:47:07,070 --> 00:47:13,750
take it one in two subjects number one

1061
00:47:08,900 --> 00:47:17,000
co2 is not a pollutant it's plain food

1062
00:47:13,750 --> 00:47:18,980
it's plant food without which pollutant

1063
00:47:17,000 --> 00:47:23,659
is a resource that is out of place that

1064
00:47:18,980 --> 00:47:26,780
includes quantity well look what the

1065
00:47:23,659 --> 00:47:30,139
quantity is very debatable because

1066
00:47:26,780 --> 00:47:33,350
apparently the the greenhouse effect

1067
00:47:30,139 --> 00:47:36,559
falls off with increased concentration

1068
00:47:33,349 --> 00:47:38,299
and Jay and water vapor is farmers yeah

1069
00:47:36,559 --> 00:47:39,829

well you might take it up at EPA I think

1070

00:47:38,300 --> 00:47:43,640
they listed it as a

1071

00:47:39,829 --> 00:47:47,569
the alone okay number two number

1072

00:47:43,639 --> 00:47:51,279
two ok how many coal-fired plants and

1073

00:47:47,570 --> 00:47:54,830
SUVs weather in the year one thousand

1074

00:47:51,280 --> 00:47:56,269
coal-burning plants yeah it's not the

1075

00:47:54,829 --> 00:47:59,289
number of plants is the amount of DC

1076

00:47:56,269 --> 00:48:01,940
medicated wats the 2001 years ago a

1077

00:47:59,289 --> 00:48:05,599
thousand years ago how many coal-fired

1078

00:48:01,940 --> 00:48:07,820
energy producing plants and SUVs were on

1079

00:48:05,599 --> 00:48:09,230
the earth there are any SUVs but I bet

1080

00:48:07,820 --> 00:48:11,769
that if you think colberine you talk

1081

00:48:09,230 --> 00:48:15,260
about people's hearts I suppose okay but

1082

00:48:11,769 --> 00:48:18,860
producing the vast amount of energy we

1083

00:48:15,260 --> 00:48:22,280
have today probably 12 11 percent or

1084
00:48:18,860 --> 00:48:24,200
less it's that yeah if that I steam

1085
00:48:22,280 --> 00:48:26,840
engines and gas turbines didn't exist

1086
00:48:24,199 --> 00:48:30,349
then good thing yeah okay did you ever

1087
00:48:26,840 --> 00:48:33,019
hear the little ice age yeah it drove

1088
00:48:30,349 --> 00:48:35,029
the Vikings off of Greenland because

1089
00:48:33,019 --> 00:48:38,480
Greenland a thousand years ago was a

1090
00:48:35,030 --> 00:48:40,519
beautiful green place right and the

1091
00:48:38,480 --> 00:48:43,699
Little Ice Age drove away because it

1092
00:48:40,519 --> 00:48:45,980
froze over the land right in co2 wasn't

1093
00:48:43,699 --> 00:48:47,989
problem back then yeah well I mean the

1094
00:48:45,980 --> 00:48:50,059
issue of global warming in the and the

1095
00:48:47,989 --> 00:48:51,169
role of co2 is has had there's a

1096
00:48:50,059 --> 00:48:53,150
consensus in the scientific community

1097
00:48:51,170 --> 00:48:55,670
that it that it should have and does

1098
00:48:53,150 --> 00:48:57,320
have an effect and the this forum is not

1099
00:48:55,670 --> 00:48:59,240
about the controversy there I know

1100
00:48:57,320 --> 00:49:00,620
they're there to size of this argument I

1101
00:48:59,239 --> 00:49:03,259
have colleagues who are on both on both

1102
00:49:00,619 --> 00:49:05,029
sides as well but based on pure

1103
00:49:03,260 --> 00:49:07,340
thermodynamics and radiative heat

1104
00:49:05,030 --> 00:49:08,480
transfer it's almost impossible for co2

1105
00:49:07,340 --> 00:49:11,230
not to have an effect on the environment

1106
00:49:08,480 --> 00:49:14,659
of the concentrations that is rising two

1107
00:49:11,230 --> 00:49:17,780
okay I can't sit here and without

1108
00:49:14,659 --> 00:49:21,489
speaking about hydrogen how many of you

1109
00:49:17,780 --> 00:49:25,010
in here have fought a hydrogen fire

1110
00:49:21,489 --> 00:49:27,979
nobody but I have when hydrogen burns

1111
00:49:25,010 --> 00:49:30,530
there is no flame that you can see and

1112

00:49:27,980 --> 00:49:33,500
in the hydrogen partner that I thought I

1113
00:49:30,530 --> 00:49:35,930
had to walk up to a valve and put my

1114
00:49:33,500 --> 00:49:38,900
hand across it and got burned to see if

1115
00:49:35,929 --> 00:49:40,819
there was a fire to put out hydrogen is

1116
00:49:38,900 --> 00:49:43,369
one of the most flammable materials

1117
00:49:40,820 --> 00:49:47,240
there is in nature is flammability

1118
00:49:43,369 --> 00:49:50,239
limits in air are 42 seventy-four

1119
00:49:47,239 --> 00:49:54,019
percent so almost any mixture that you

1120
00:49:50,239 --> 00:49:57,649
have of hydrogen in air is a bomb and I

1121
00:49:54,019 --> 00:50:00,889
don't want that in my garage secondly

1122
00:49:57,650 --> 00:50:04,760
the weather it always always talked to

1123
00:50:00,889 --> 00:50:07,579
already talked about that its energy

1124
00:50:04,760 --> 00:50:10,250
wise it's not a good idea because it

1125
00:50:07,579 --> 00:50:13,519
always takes more energy to get the

1126
00:50:10,250 --> 00:50:15,920

hydrogen out then it then you get out of

1127

00:50:13,519 --> 00:50:17,719

it and that you're that all you're only

1128

00:50:15,920 --> 00:50:21,380

going to get a fraction of that energy

1129

00:50:17,719 --> 00:50:23,359

patch right engines and i'm in favor of

1130

00:50:21,380 --> 00:50:25,160

no more burning of anything because

1131

00:50:23,360 --> 00:50:27,829

there are plenty of opportunities to be

1132

00:50:25,159 --> 00:50:31,849

developed and be applied right now today

1133

00:50:27,829 --> 00:50:35,059

and so the hydrogen is is it's just so

1134

00:50:31,849 --> 00:50:37,549

dangerous if there's any other way that

1135

00:50:35,059 --> 00:50:39,529

we can get our energy we don't want to I

1136

00:50:37,550 --> 00:50:41,720

can tell you because I thought hydrogen

1137

00:50:39,530 --> 00:50:45,170

fires I know what it's like I've been

1138

00:50:41,719 --> 00:50:47,000

there and we don't want to do that so

1139

00:50:45,170 --> 00:50:49,880

I'm disappointed in you two guys I was

1140

00:50:47,000 --> 00:50:53,800

expecting you to say that why are we

1141
00:50:49,880 --> 00:50:53,800
going after conventional nuclear power

1142
00:50:57,730 --> 00:51:06,199
I'd like to speak to can go and I'm a

1143
00:51:02,630 --> 00:51:09,410
little nervous folks please forgive me I

1144
00:51:06,199 --> 00:51:11,719
think I think actually everyone is

1145
00:51:09,409 --> 00:51:14,710
missing one real important source of

1146
00:51:11,719 --> 00:51:19,699
energy and that is the human body and

1147
00:51:14,710 --> 00:51:21,559
when you were speaking Ken I'm guided by

1148
00:51:19,699 --> 00:51:23,419
many spirits who work through my

1149
00:51:21,559 --> 00:51:27,230
physical body some of you have lit heard

1150
00:51:23,420 --> 00:51:30,050
them and what I don't usually see things

1151
00:51:27,230 --> 00:51:32,240
though but so this was very unusual so I

1152
00:51:30,050 --> 00:51:36,289
know it was important when you were

1153
00:51:32,239 --> 00:51:41,659
speaking they showed me these two lines

1154
00:51:36,289 --> 00:51:43,880
of zigzag psychedelic lines up here that

1155
00:51:41,659 --> 00:51:45,079
kept distracting me from looking I

1156
00:51:43,880 --> 00:51:48,340
couldn't even look at you for the

1157
00:51:45,079 --> 00:51:51,380
distraction there was a third line also

1158
00:51:48,340 --> 00:51:54,530
it was not exactly with the other two

1159
00:51:51,380 --> 00:51:55,068
and they were kind of they what they

1160
00:51:54,530 --> 00:51:59,449
made me

1161
00:51:55,068 --> 00:52:02,028
enka was a synapse of our brain one

1162
00:51:59,449 --> 00:52:06,499
nerve ending reaching another nerve

1163
00:52:02,028 --> 00:52:10,699
ending and you kind of downplayed bills

1164
00:52:06,498 --> 00:52:13,578
a comment about intention but i think my

1165
00:52:10,699 --> 00:52:16,209
guides want you to you especially to

1166
00:52:13,579 --> 00:52:19,640
think about the possibility of using

1167
00:52:16,208 --> 00:52:24,558
intention along with what you have

1168
00:52:19,639 --> 00:52:27,768
developed that the human brain can help

1169

00:52:24,559 --> 00:52:29,539
it yes very definitely and we are still

1170
00:52:27,768 --> 00:52:31,548
living on the same planet with the same

1171
00:52:29,539 --> 00:52:33,739
physical resources as over a hundred

1172
00:52:31,548 --> 00:52:36,440
years ago with one-tenth population

1173
00:52:33,739 --> 00:52:38,719
which back then only about 1% of the

1174
00:52:36,440 --> 00:52:41,358
population was well off and what is it

1175
00:52:38,719 --> 00:52:42,829
now today about ten percent people live

1176
00:52:41,358 --> 00:52:45,920
are well off that's a hundred times

1177
00:52:42,829 --> 00:52:47,809
increase in the ability to live decently

1178
00:52:45,920 --> 00:52:49,489
on this planet but it's the same planet

1179
00:52:47,809 --> 00:52:51,380
with the same resources and ten times

1180
00:52:49,489 --> 00:52:53,239
the number of people what happened it's

1181
00:52:51,380 --> 00:52:55,608
our ability to live with our environment

1182
00:52:53,239 --> 00:52:57,708
in each other and that's part of what

1183
00:52:55,608 --> 00:52:59,389

you're saying there is that a tremendous

1184

00:52:57,708 --> 00:53:02,208

resource to make this energy work as

1185

00:52:59,389 --> 00:53:03,679

just our own our own social skills that

1186

00:53:02,208 --> 00:53:08,298

can have lots of room for improvement

1187

00:53:03,679 --> 00:53:10,219

yet I i guess my own personal opinion

1188

00:53:08,298 --> 00:53:13,639

after listening to all this well before

1189

00:53:10,219 --> 00:53:14,958

that also is zero-point energy is

1190

00:53:13,639 --> 00:53:17,088

probably the one that's going to be the

1191

00:53:14,958 --> 00:53:20,739

answer to all of the requirements that

1192

00:53:17,088 --> 00:53:24,318

we have so my question is how much

1193

00:53:20,739 --> 00:53:26,749

research is being done and how much is

1194

00:53:24,318 --> 00:53:29,808

required to bring zero-point energy

1195

00:53:26,748 --> 00:53:34,998

online you know it's some whenever that

1196

00:53:29,809 --> 00:53:37,609

might happen and if you let me put it

1197

00:53:34,998 --> 00:53:42,139

this way if you had all the money that

1198
00:53:37,608 --> 00:53:44,478
you could spend how fast could you think

1199
00:53:42,139 --> 00:53:49,489
that we could get the necessary research

1200
00:53:44,478 --> 00:53:51,228
done to utilize zero-point energy limit

1201
00:53:49,489 --> 00:53:52,190
or in comment notice that there are lots

1202
00:53:51,228 --> 00:53:54,049
and lots of rumors

1203
00:53:52,190 --> 00:53:55,760
around on the internet about devices

1204
00:53:54,050 --> 00:53:57,710
that already exists that have zero point

1205
00:53:55,760 --> 00:54:00,319
energy etc etc I don't leave a word of

1206
00:53:57,710 --> 00:54:02,240
that sit tight yes for years and years I

1207
00:54:00,318 --> 00:54:04,338
think all those things are strictly hoax

1208
00:54:02,239 --> 00:54:05,509
and hoaxes and cons and I don't think is

1209
00:54:04,338 --> 00:54:07,309
needed by sitting out there the shelf

1210
00:54:05,510 --> 00:54:09,050
somewhere in this being withheld from us

1211
00:54:07,309 --> 00:54:10,309
by the virtue of the greedy all

1212
00:54:09,050 --> 00:54:13,730
companies or in the government or

1213
00:54:10,309 --> 00:54:16,099
whatever in terms of what it would take

1214
00:54:13,730 --> 00:54:19,309
to demonstrate a zero-point energy can

1215
00:54:16,099 --> 00:54:21,170
be a viable source it's really not that

1216
00:54:19,309 --> 00:54:23,960
much amount of money we're looking

1217
00:54:21,170 --> 00:54:24,980
forward to pursue our patent to carry on

1218
00:54:23,960 --> 00:54:26,449
service here at the University of

1219
00:54:24,980 --> 00:54:29,000
Colorado by the way from the laboratory

1220
00:54:26,449 --> 00:54:31,578
is it's on the order of maybe 10 or 20

1221
00:54:29,000 --> 00:54:32,659
million dollars as we're looking for and

1222
00:54:31,579 --> 00:54:35,599
I think with that amount of money we

1223
00:54:32,659 --> 00:54:37,549
probably pretty definitively either show

1224
00:54:35,599 --> 00:54:39,910
that the effect that we require to make

1225
00:54:37,550 --> 00:54:43,849
this work is real or that is a dead end

1226

00:54:39,909 --> 00:54:45,730
you don't have to say that's absolutely

1227
00:54:43,849 --> 00:54:47,559
nuts

1228
00:54:45,730 --> 00:54:49,960
well I certainly peanuts compared to the

1229
00:54:47,559 --> 00:54:51,989
hot fusion it's his murder how many

1230
00:54:49,960 --> 00:54:54,429
billions of dollars it's more of a

1231
00:54:51,989 --> 00:54:56,469
people problem than is a technology

1232
00:54:54,429 --> 00:54:59,769
problem here's a humorous rule of thumb

1233
00:54:56,469 --> 00:55:03,730
for these sorts of frontier developments

1234
00:54:59,769 --> 00:55:05,259
that a fellow researcher that I know in

1235
00:55:03,730 --> 00:55:06,730
the field brought this up says the

1236
00:55:05,260 --> 00:55:09,280
effort that it takes to get these sort

1237
00:55:06,730 --> 00:55:12,309
of projects to a practical level ten

1238
00:55:09,280 --> 00:55:14,650
percent of the energy of the effort is

1239
00:55:12,309 --> 00:55:16,299
the technology itself twenty percent of

1240
00:55:14,650 --> 00:55:18,730

the effort is overcoming suppression

1241

00:55:16,300 --> 00:55:20,680

interference thirty percent of the

1242

00:55:18,730 --> 00:55:22,420

effort is finding adequate funding in

1243

00:55:20,679 --> 00:55:24,489

the remaining forty percent is just

1244

00:55:22,420 --> 00:55:28,420

interpersonal politics getting people to

1245

00:55:24,489 --> 00:55:30,250

cooperate terms are the words of

1246

00:55:28,420 --> 00:55:32,220

freshmen I don't have any sense of any

1247

00:55:30,250 --> 00:55:35,710

suppression taking place it's simply

1248

00:55:32,219 --> 00:55:38,489

skepticism and subscriptions yep the

1249

00:55:35,710 --> 00:55:40,929

only suppression I know of his just

1250

00:55:38,489 --> 00:55:42,699

maneuvering within industry of somebody

1251

00:55:40,929 --> 00:55:47,440

not wanting competition from somebody

1252

00:55:42,699 --> 00:55:49,719

else there's no indication actually knew

1253

00:55:47,440 --> 00:55:52,420

that is simply ignorance and Prejudice

1254

00:55:49,719 --> 00:55:57,608

because something is new and that their

1255
00:55:52,420 --> 00:56:00,280
children work well well well well

1256
00:55:57,608 --> 00:56:02,679
blabber thank ya thank thank you thank

1257
00:56:00,280 --> 00:56:04,990
you moderator I want to follow up on

1258
00:56:02,679 --> 00:56:06,639
that lady's suggestion about the body

1259
00:56:04,989 --> 00:56:08,500
what came to me and she was saying it

1260
00:56:06,639 --> 00:56:12,879
it's just in a flash never thought of

1261
00:56:08,500 --> 00:56:14,858
this before but uh spoon pending right

1262
00:56:12,880 --> 00:56:16,990
this takes this is something that the

1263
00:56:14,858 --> 00:56:19,119
body presumably is doing in some way and

1264
00:56:16,989 --> 00:56:21,009
it takes incredible and it has anybody

1265
00:56:19,119 --> 00:56:23,410
done a calculation of the energy that it

1266
00:56:21,010 --> 00:56:25,300
takes to bend the spoon has anybody done

1267
00:56:23,409 --> 00:56:26,980
any measurements on transfers of

1268
00:56:25,300 --> 00:56:29,740
energies from the body to the spoon

1269
00:56:26,980 --> 00:56:31,690
during these spoon bending parties it

1270
00:56:29,739 --> 00:56:33,339
wouldn't be very much I mean the amount

1271
00:56:31,690 --> 00:56:35,889
of energy if you can if you can take a

1272
00:56:33,340 --> 00:56:37,900
spoon and bend it with pretty advice and

1273
00:56:35,889 --> 00:56:40,599
putting on let's say 50 pounds of force

1274
00:56:37,900 --> 00:56:42,130
or something like that to bend it okay

1275
00:56:40,599 --> 00:56:44,139
800 pounds but it but if you move if you

1276
00:56:42,130 --> 00:56:46,420
move that through a small angle you know

1277
00:56:44,139 --> 00:56:47,618
integral of torque times the angle gives

1278
00:56:46,420 --> 00:56:51,360
you the work the work could just be in

1279
00:56:47,619 --> 00:56:54,180
the order of jewels yes also just

1280
00:56:51,360 --> 00:56:57,220
it's interesting on a number of fronts

1281
00:56:54,179 --> 00:56:58,419
so according to Jack Howell what he was

1282
00:56:57,219 --> 00:57:00,429
talking about this morning is is you

1283

00:56:58,420 --> 00:57:02,590
sort of essentially greased the grain

1284
00:57:00,429 --> 00:57:05,169
boundaries of the metal which allows the

1285
00:57:02,590 --> 00:57:07,420
the spoon to bend and so there's very

1286
00:57:05,170 --> 00:57:08,980
very little energy involved you're not

1287
00:57:07,420 --> 00:57:13,269
actually bending the spoon in its

1288
00:57:08,980 --> 00:57:15,789
conventional state however to support

1289
00:57:13,269 --> 00:57:18,099
what you're saying you know one of my

1290
00:57:15,789 --> 00:57:20,110
students is working on on on low energy

1291
00:57:18,099 --> 00:57:22,569
nuclear reaction and one of the big

1292
00:57:20,110 --> 00:57:25,870
problems with this is sometimes it

1293
00:57:22,570 --> 00:57:28,360
appears sometimes it doesn't and it just

1294
00:57:25,869 --> 00:57:31,269
fits perfectly into the paradigm of is

1295
00:57:28,360 --> 00:57:33,039
it an intention based phenomenon you

1296
00:57:31,269 --> 00:57:35,259
know I have no evidence that it is I

1297
00:57:33,039 --> 00:57:40,449

cannot say it is but it's certainly an

1298

00:57:35,260 --> 00:57:41,860

interesting question NASA worked on an

1299

00:57:40,449 --> 00:57:43,989

experiment a while back through the

1300

00:57:41,860 --> 00:57:46,750

Space Shuttle that involved a long

1301

00:57:43,989 --> 00:57:49,629

lanyard conductor stretched way out in

1302

00:57:46,750 --> 00:57:51,460

space that produced quite a bit of

1303

00:57:49,630 --> 00:57:53,289

electricity in fact I think it exceeded

1304

00:57:51,460 --> 00:57:54,639

their wildest dreams so much so that it

1305

00:57:53,289 --> 00:57:57,460

conducted current and I think it broke

1306

00:57:54,639 --> 00:57:59,589

the cable there's new materials being

1307

00:57:57,460 --> 00:58:04,030

generated now talk of a space elevator

1308

00:57:59,590 --> 00:58:07,059

carbon fiber tubules and so on the earth

1309

00:58:04,030 --> 00:58:08,920

turning through a magnetic field with

1310

00:58:07,059 --> 00:58:11,110

the conductor generates lots of

1311

00:58:08,920 --> 00:58:13,840

electricity is that not cannot beat not

1312
00:58:11,110 --> 00:58:16,329
be scaled up to be something practical

1313
00:58:13,840 --> 00:58:17,980
yes we can but we don't know what the

1314
00:58:16,329 --> 00:58:19,750
side effects are from disturbing the

1315
00:58:17,980 --> 00:58:23,079
ionosphere by tapping that much

1316
00:58:19,750 --> 00:58:24,909
electricity out of it we don't know that

1317
00:58:23,079 --> 00:58:26,679
the side effects it's already put a

1318
00:58:24,909 --> 00:58:29,109
damper on it but I'm just cautious of

1319
00:58:26,679 --> 00:58:36,460
where is this energy coming from and

1320
00:58:29,110 --> 00:58:38,650
what's it doing oh yes tapping lightning

1321
00:58:36,460 --> 00:58:43,449
is a very dangerous thing it's how do

1322
00:58:38,650 --> 00:58:45,280
you limit it it's getting a tiger by the

1323
00:58:43,449 --> 00:58:46,539
tail for sure well well the world is

1324
00:58:45,280 --> 00:58:48,910
full of energy if you look at the amount

1325
00:58:46,539 --> 00:58:51,460
of solar radiation pinching on the

1326
00:58:48,909 --> 00:58:53,739
planet continuously it's enough to power

1327
00:58:51,460 --> 00:58:55,240
civilization a thousand times over but

1328
00:58:53,739 --> 00:58:58,029
it's not high grade energy when it's

1329
00:58:55,239 --> 00:58:59,799
just blowing in as low breezes or in

1330
00:58:58,030 --> 00:59:02,200
and mildly warm water on the surface of

1331
00:58:59,800 --> 00:59:03,580
the ocean it's it's low grade and you

1332
00:59:02,199 --> 00:59:05,619
have to have apparatus to extract it

1333
00:59:03,579 --> 00:59:07,389
from so it's not a question of whether

1334
00:59:05,619 --> 00:59:09,819
they're free energy sources it also is a

1335
00:59:07,389 --> 00:59:12,609
matter of of conversion the apparatus

1336
00:59:09,820 --> 00:59:13,600
necessary for that transport storage all

1337
00:59:12,610 --> 00:59:16,720
of these things all that infrastructure

1338
00:59:13,599 --> 00:59:18,610
and so you can't simply just talk about

1339
00:59:16,719 --> 00:59:21,250
where the energy is it's a question of

1340

00:59:18,610 --> 00:59:23,050
is it is that ubiquitous is a portables

1341
00:59:21,250 --> 00:59:24,880
at high energy density is a cheap is it

1342
00:59:23,050 --> 00:59:28,030
green all of these things become are

1343
00:59:24,880 --> 00:59:30,130
important here and and what what would

1344
00:59:28,030 --> 00:59:32,470
Garrett and Bernie are proposing and

1345
00:59:30,130 --> 00:59:33,730
Kenner are possibilities where these

1346
00:59:32,469 --> 00:59:35,379
things would be in principle could be

1347
00:59:33,730 --> 00:59:37,150
portable devices the size of this bottle

1348
00:59:35,380 --> 00:59:38,410
and something this size would would be

1349
00:59:37,150 --> 00:59:41,769
at the center of your household running

1350
00:59:38,409 --> 00:59:43,029
it ad infinitum that would that's the

1351
00:59:41,769 --> 00:59:44,619
kind of radical change we're talking

1352
00:59:43,030 --> 00:59:46,960
about get rid of the infrastructure you

1353
00:59:44,619 --> 00:59:48,730
know you could scrap the the electrical

1354
00:59:46,960 --> 00:59:50,650

grids in the United States put away all

1355

00:59:48,730 --> 00:59:53,289

the all the power plants bury them very

1356

00:59:50,650 --> 00:59:55,780

the nuclear power plants it would you

1357

00:59:53,289 --> 00:59:58,150

get rid of all the oil tankers no more

1358

00:59:55,780 --> 00:59:59,620

railroads from coal mines shut down the

1359

00:59:58,150 --> 01:00:01,510

coal mines shut down the oil fields

1360

00:59:59,619 --> 01:00:03,309

everything all this stuff would change

1361

01:00:01,510 --> 01:00:04,630

it would be a radical change and what

1362

01:00:03,309 --> 01:00:06,460

I'm really interested in is hearing your

1363

01:00:04,630 --> 01:00:08,110

ideas about how radical this would be

1364

01:00:06,460 --> 01:00:12,820

and whether it would actually be a good

1365

01:00:08,110 --> 01:00:14,890

thing my argument it basically is this

1366

01:00:12,820 --> 01:00:17,019

now in the paper that in the jse

1367

01:00:14,889 --> 01:00:18,759

ultimately I think it is a bad thing and

1368

01:00:17,019 --> 01:00:20,530

reason is is because if you have

1369
01:00:18,760 --> 01:00:22,570
unlimited energy that will allow you to

1370
01:00:20,530 --> 01:00:24,700
pillage the planet that much more

1371
01:00:22,570 --> 01:00:26,410
quickly you could you could make you can

1372
01:00:24,699 --> 01:00:27,730
make fishing trawlers which never have

1373
01:00:26,409 --> 01:00:30,129
to come into port until they were full

1374
01:00:27,730 --> 01:00:32,230
you could you could build undoing

1375
01:00:30,130 --> 01:00:33,430
machines to cut down entire swathes the

1376
01:00:32,230 --> 01:00:35,349
forest without ever having to repower

1377
01:00:33,429 --> 01:00:37,750
them you could build engines of war that

1378
01:00:35,349 --> 01:00:40,029
never needed to be refueled no no fewer

1379
01:00:37,750 --> 01:00:41,920
lines having to go out I'm your creative

1380
01:00:40,030 --> 01:00:44,260
anti-gravity for precisely that reason

1381
01:00:41,920 --> 01:00:46,240
well you could you could go on mining

1382
01:00:44,260 --> 01:00:48,520
for as much as you want all the oars so

1383
01:00:46,239 --> 01:00:51,069
I mean ultimately it's a matter of our

1384
01:00:48,519 --> 01:00:52,360
human nature if we had unlimited amounts

1385
01:00:51,070 --> 01:00:53,920
of energy what would we do with it I'm

1386
01:00:52,360 --> 01:01:01,329
not sure it would necessarily be a good

1387
01:00:53,920 --> 01:01:02,590
thing that's quite interesting I I was

1388
01:01:01,329 --> 01:01:06,250
kind of comment on something a little

1389
01:01:02,590 --> 01:01:08,350
earlier about how well uh how well off

1390
01:01:06,250 --> 01:01:09,849
we are and I agree that we are better

1391
01:01:08,349 --> 01:01:13,750
off now than

1392
01:01:09,849 --> 01:01:16,329
we have been for centuries but I I see

1393
01:01:13,750 --> 01:01:18,489
that we're not necessarily going to

1394
01:01:16,329 --> 01:01:22,329
continue this way right now we're kind

1395
01:01:18,489 --> 01:01:26,829
of reaching a point where my kids are

1396
01:01:22,329 --> 01:01:29,380
projected to live less years than I am

1397

01:01:26,829 --> 01:01:31,889
you know we've just kind of Crested now

1398
01:01:29,380 --> 01:01:34,090
or stresses up this for sure yeah and

1399
01:01:31,889 --> 01:01:36,819
facility to destroy ourselves has

1400
01:01:34,090 --> 01:01:38,019
accelerated tremendously absolutely

1401
01:01:36,820 --> 01:01:39,640
we've had the ability to destroy

1402
01:01:38,019 --> 01:01:41,800
ourselves for quite some time now and

1403
01:01:39,639 --> 01:01:46,809
it's fortunate we didn't do that in the

1404
01:01:41,800 --> 01:01:47,950
80s with the Russians and all but and is

1405
01:01:46,809 --> 01:01:50,980
it do you think it's better that we're

1406
01:01:47,949 --> 01:01:53,109
limited by the the dearth of natural

1407
01:01:50,980 --> 01:01:55,780
resources well I think the

1408
01:01:53,110 --> 01:01:58,960
infrastructure that's that's in power

1409
01:01:55,780 --> 01:02:05,680
now would definitely be opposed to any

1410
01:01:58,960 --> 01:02:09,309
type of free energy if if the nation's

1411
01:02:05,679 --> 01:02:13,440

the west wall to do nations had free

1412

01:02:09,309 --> 01:02:16,090

energy and they weren't dependent on us

1413

01:02:13,440 --> 01:02:18,789

that would really shift about the

1414

01:02:16,090 --> 01:02:21,370

balance of power considerably yes mom

1415

01:02:18,789 --> 01:02:25,960

and I agree with your concerns about it

1416

01:02:21,369 --> 01:02:29,859

being abused and and the power

1417

01:02:25,960 --> 01:02:33,909

infrastructure you know oil I mean these

1418

01:02:29,860 --> 01:02:36,070

are big players in our economy imagine

1419

01:02:33,909 --> 01:02:37,599

what what would happen to our finances

1420

01:02:36,070 --> 01:02:40,960

if all of a sudden we didn't have to pay

1421

01:02:37,599 --> 01:02:42,549

for the power bill well it's not just

1422

01:02:40,960 --> 01:02:44,980

the power bills everything you every

1423

01:02:42,550 --> 01:02:48,580

single product you own has has energy

1424

01:02:44,980 --> 01:02:52,269

costs behind it right I mean China could

1425

01:02:48,579 --> 01:02:54,940

produce just tons of stuff you know even

1426
01:02:52,269 --> 01:02:57,849
more cheaply if they didn't have the

1427
01:02:54,940 --> 01:02:59,500
energy requirements so how many of you

1428
01:02:57,849 --> 01:03:01,029
think that we shouldn't actually we

1429
01:02:59,500 --> 01:03:05,940
should not actually develop a free

1430
01:03:01,030 --> 01:03:05,940
energy source one

1431
01:03:19,090 --> 01:03:24,890
resources but we know that some

1432
01:03:23,150 --> 01:03:28,519
societies choose now to invent certain

1433
01:03:24,889 --> 01:03:30,129
things society doesn't just follow this

1434
01:03:28,519 --> 01:03:32,900
course and it's not necessarily

1435
01:03:30,130 --> 01:03:36,590
predetermined based on what is best and

1436
01:03:32,900 --> 01:03:37,880
what is most powerful um somebody said

1437
01:03:36,590 --> 01:03:39,590
that well maybe that there are

1438
01:03:37,880 --> 01:03:41,349
mechanisms like all industries I would

1439
01:03:39,590 --> 01:03:43,640
you know hole will hold us down from

1440
01:03:41,349 --> 01:03:47,409
developing something like this and maybe

1441
01:03:43,639 --> 01:03:50,029
that's not realistic maybe it is but

1442
01:03:47,409 --> 01:03:52,190
maybe there are just mechanisms built

1443
01:03:50,030 --> 01:03:55,670
into any system that forms societies

1444
01:03:52,190 --> 01:03:57,530
that prevent it from developing mostly

1445
01:03:55,670 --> 01:04:00,050
powerful technologies i can destroy it

1446
01:03:57,530 --> 01:04:01,760
like biotechnology if it becomes

1447
01:04:00,050 --> 01:04:04,220
ubiquitous then you can have hackers

1448
01:04:01,760 --> 01:04:06,320
that would make viruses that could kill

1449
01:04:04,219 --> 01:04:07,909
everybody right so maybe there's a

1450
01:04:06,320 --> 01:04:12,490
similar I don't know if that's realistic

1451
01:04:07,909 --> 01:04:14,420
or not but yes I've got one over here

1452
01:04:12,489 --> 01:04:15,799
maybe we'll put up maybe we'll put the

1453
01:04:14,420 --> 01:04:24,858
microphone on the stand let people line

1454

01:04:15,800 --> 01:04:29,510
up sounds good and that look up doll me

1455
01:04:24,858 --> 01:04:33,710
extraneous comments I've heard a lot of

1456
01:04:29,510 --> 01:04:35,510
talk about the cost of energy and I just

1457
01:04:33,710 --> 01:04:37,670
want to remind everybody that money is

1458
01:04:35,510 --> 01:04:39,710
fake we invented the financial system

1459
01:04:37,670 --> 01:04:42,650
the monetary system will live in is a

1460
01:04:39,710 --> 01:04:45,050
construct that regulates our environment

1461
01:04:42,650 --> 01:04:47,150
that we currently reside in um another

1462
01:04:45,050 --> 01:04:48,950
interesting thing that i think i should

1463
01:04:47,150 --> 01:04:52,190
mention is known as talked about Nikola

1464
01:04:48,949 --> 01:04:54,858
Tesla at all and Wardencllyffe tower and

1465
01:04:52,190 --> 01:04:57,079
tapping Liana's you inherited it so we

1466
01:04:54,858 --> 01:04:58,969
can get there so I couldn't learn yet

1467
01:04:57,079 --> 01:05:00,829
guys his thoughts on Nikola Tesla and

1468
01:04:58,969 --> 01:05:02,480

his technology the fact that the

1469

01:05:00,829 --> 01:05:04,759

monetary system brought his technology

1470

01:05:02,480 --> 01:05:07,969

to a halt because they couldn't put a

1471

01:05:04,760 --> 01:05:10,670

meter on money that would own energy

1472

01:05:07,969 --> 01:05:13,939

that was free so really the question is

1473

01:05:10,670 --> 01:05:15,590

immune are we going to idea over the

1474

01:05:13,940 --> 01:05:17,269

cost of doing this or we're going to go

1475

01:05:15,590 --> 01:05:19,760

extinct because free energy is

1476

01:05:17,269 --> 01:05:21,559

inevitable if we don't extent the world

1477

01:05:19,760 --> 01:05:23,450

is going to work perfectly the Sun is

1478

01:05:21,559 --> 01:05:25,699

going to function perfectly that's 4G

1479

01:05:23,449 --> 01:05:28,759

part of the Tesla mystique is also

1480

01:05:25,699 --> 01:05:29,939

steeped in the wannabe hype that's so

1481

01:05:28,760 --> 01:05:31,740

prevalent on the inner

1482

01:05:29,940 --> 01:05:35,250

but there is some truth behind that

1483
01:05:31,739 --> 01:05:39,449
we're still sorting out what that genius

1484
01:05:35,250 --> 01:05:41,940
did and what he didn't do just as a

1485
01:05:39,449 --> 01:05:43,949
thought to go somewhere with it I have a

1486
01:05:41,940 --> 01:05:45,929
fellow researcher in western Washington

1487
01:05:43,949 --> 01:05:48,088
the two of us have figured out how to

1488
01:05:45,929 --> 01:05:50,489
generate Paul lightning on demand which

1489
01:05:48,088 --> 01:05:53,639
is a thing that previously had only been

1490
01:05:50,489 --> 01:05:55,348
attributed to him and we can do that now

1491
01:05:53,639 --> 01:05:57,059
we don't see it as a source of energy

1492
01:05:55,349 --> 01:06:02,160
but we see more it as a medium for

1493
01:05:57,059 --> 01:06:04,799
processing things right I had a comment

1494
01:06:02,159 --> 01:06:07,818
related to what Bernie had said that he

1495
01:06:04,800 --> 01:06:10,050
was not aware of any suppression of

1496
01:06:07,818 --> 01:06:12,179
inventions and a lot of you know there's

1497
01:06:10,050 --> 01:06:13,980
a lot of conspiracy theories about that

1498
01:06:12,179 --> 01:06:17,039
and all but that the fact of the matter

1499
01:06:13,980 --> 01:06:18,380
is is that it is well documented the

1500
01:06:17,039 --> 01:06:21,269
government the United States government

1501
01:06:18,380 --> 01:06:26,280
itself provides the information that

1502
01:06:21,269 --> 01:06:28,050
certain inventions are suppressed not in

1503
01:06:26,280 --> 01:06:31,470
not in terms of what we conventionally

1504
01:06:28,050 --> 01:06:35,250
think of but in terms of secrecy orders

1505
01:06:31,469 --> 01:06:36,989
I sent away a few years ago to get

1506
01:06:35,250 --> 01:06:40,469
through the Freedom of Information Act

1507
01:06:36,989 --> 01:06:43,858
to the Patent Office and asked for a

1508
01:06:40,469 --> 01:06:46,108
listing of all of the just statistics

1509
01:06:43,858 --> 01:06:47,848
because they won't release the names of

1510
01:06:46,108 --> 01:06:49,920
the patents but I asked for the

1511

01:06:47,849 --> 01:06:52,980
statistics in which they had issued

1512
01:06:49,920 --> 01:06:55,230
secrecy orders and if you have ever seen

1513
01:06:52,980 --> 01:06:58,740
a secrecy order it disallows the

1514
01:06:55,230 --> 01:07:01,440
inventor to even talk publish or say

1515
01:06:58,739 --> 01:07:03,679
anything about the invention that has

1516
01:07:01,440 --> 01:07:06,690
the secrecy order because it's a legal

1517
01:07:03,679 --> 01:07:08,699
enforceable document by the executive

1518
01:07:06,690 --> 01:07:10,559
department you know that that they

1519
01:07:08,699 --> 01:07:13,409
cannot talk about it or anything but

1520
01:07:10,559 --> 01:07:15,469
their statistics were at that time just

1521
01:07:13,409 --> 01:07:19,799
a few years ago that there were

1522
01:07:15,469 --> 01:07:23,818
approximately 6,000 secrecy orders well

1523
01:07:19,800 --> 01:07:27,240
on 6000 inventions which nobody could

1524
01:07:23,818 --> 01:07:29,159
find anything out about and which the

1525
01:07:27,239 --> 01:07:32,219

inventors could not talk about or

1526

01:07:29,159 --> 01:07:34,440

publish about so if you're interested in

1527

01:07:32,219 --> 01:07:37,169

I mean the question of suppression I

1528

01:07:34,440 --> 01:07:39,030

mean it was it's it's done under the

1529

01:07:37,170 --> 01:07:40,349

guise of you know it to protect the

1530

01:07:39,030 --> 01:07:41,970

national security of the United States

1531

01:07:40,349 --> 01:07:43,789

which i think is important because you

1532

01:07:41,969 --> 01:07:46,159

wouldn't want people to invent a

1533

01:07:43,789 --> 01:07:48,170

a gun obviously that that you know

1534

01:07:46,159 --> 01:07:50,059

perhaps as a poor gun or something could

1535

01:07:48,170 --> 01:07:52,309

people be running around killing people

1536

01:07:50,059 --> 01:07:54,949

or whatever but the fact of the matter

1537

01:07:52,309 --> 01:07:57,920

is that there are at least 6,000

1538

01:07:54,949 --> 01:08:00,589

inventions that the that the Patent

1539

01:07:57,920 --> 01:08:02,869

Office has already established the

1540
01:08:00,590 --> 01:08:04,760
secrecy orders on and since nineteen

1541
01:08:02,869 --> 01:08:07,609
forty-two because they sent me the the

1542
01:08:04,760 --> 01:08:09,350
thought it was 47 that the National

1543
01:08:07,610 --> 01:08:11,240
Security Act came through well it may

1544
01:08:09,349 --> 01:08:13,429
have been they had secrecy orders even

1545
01:08:11,239 --> 01:08:15,979
before 1947 okay but I think there's a

1546
01:08:13,429 --> 01:08:17,389
difference here and let me finish we're

1547
01:08:15,980 --> 01:08:20,750
going to finish rather than being

1548
01:08:17,390 --> 01:08:23,810
interrupted the since nineteen forty-two

1549
01:08:20,750 --> 01:08:26,510
there had been over 10,000 secrecy

1550
01:08:23,810 --> 01:08:29,210
orders established but they do lift them

1551
01:08:26,510 --> 01:08:30,530
after certain periods of time but in any

1552
01:08:29,210 --> 01:08:32,149
case I just want to make it clear that

1553
01:08:30,529 --> 01:08:33,710
there have been secrets yours and there

1554
01:08:32,149 --> 01:08:37,219
are thousands of inventions out there

1555
01:08:33,710 --> 01:08:39,140
that nobody knows about and obviously

1556
01:08:37,220 --> 01:08:42,440
you know some of those I could include

1557
01:08:39,140 --> 01:08:44,000
advanced technologies that that you for

1558
01:08:42,439 --> 01:08:45,379
folks have been doing research on that

1559
01:08:44,000 --> 01:08:47,899
you wouldn't know about because the

1560
01:08:45,380 --> 01:08:49,579
inventor can't talk about it okay no

1561
01:08:47,899 --> 01:08:51,769
sure well that lepers experience all

1562
01:08:49,579 --> 01:08:53,960
yeah certainly this crossed my mind a

1563
01:08:51,770 --> 01:08:55,220
bit when when we were applying for the

1564
01:08:53,960 --> 01:08:56,838
patent on the zero-point energy device

1565
01:08:55,220 --> 01:08:58,250
about well you know maybe there's some

1566
01:08:56,838 --> 01:09:01,279
chance this will happen i hate the cs

1567
01:08:58,250 --> 01:09:04,130
secrecy order put over us but in fact

1568

01:09:01,279 --> 01:09:06,489
nothing whatsoever I never ever crossed

1569
01:09:04,130 --> 01:09:09,409
my radar screen but there was not any

1570
01:09:06,489 --> 01:09:11,599
possibility that's happening and it

1571
01:09:09,409 --> 01:09:14,510
didn't and that proves you the one or

1572
01:09:11,600 --> 01:09:15,980
two things either that they don't do

1573
01:09:14,510 --> 01:09:17,510
these secrecy things very often and out

1574
01:09:15,979 --> 01:09:18,798
in this area or they've got this so

1575
01:09:17,510 --> 01:09:21,260
wrong you know it's not gonna work they

1576
01:09:18,798 --> 01:09:23,298
don't care well well that's a

1577
01:09:21,260 --> 01:09:25,909
possibility Bernie but maybe it wasn't

1578
01:09:23,298 --> 01:09:28,130
it you know dangerous enough that would

1579
01:09:25,909 --> 01:09:29,869
that would threaten the security the

1580
01:09:28,130 --> 01:09:31,520
United States and some fashion but there

1581
01:09:29,869 --> 01:09:34,818
are at least six hours now because I I

1582
01:09:31,520 --> 01:09:36,200

checked just maybe a few months ago as

1583

01:09:34,819 --> 01:09:38,630

well and there still is about the same

1584

01:09:36,199 --> 01:09:41,449

numbers or what well I don't think it's

1585

01:09:38,630 --> 01:09:43,310

going to apply our policy for most of us

1586

01:09:41,449 --> 01:09:44,210

i think is to publish these results once

1587

01:09:43,310 --> 01:09:46,789

they go out into the open literature

1588

01:09:44,210 --> 01:09:48,140

they can't be suppressed and and they're

1589

01:09:46,789 --> 01:09:49,760

they're not going to gag academics

1590

01:09:48,140 --> 01:09:51,710

because that's not going to happen right

1591

01:09:49,760 --> 01:09:53,420

well that's what i've said you know to

1592

01:09:51,710 --> 01:09:54,569

keep you from being suppressed just

1593

01:09:53,420 --> 01:09:56,279

publish it on the Internet

1594

01:09:54,569 --> 01:09:57,328

there better ways of suppressing in the

1595

01:09:56,279 --> 01:09:58,679

old days they used to burn you at the

1596

01:09:57,328 --> 01:10:06,630

stake for heresy now they just don't

1597
01:09:58,679 --> 01:10:09,690
fund you and then from the science

1598
01:10:06,630 --> 01:10:11,969
fiction world there are two Robert

1599
01:10:09,689 --> 01:10:13,138
Heinlein stories and I'm only going to

1600
01:10:11,969 --> 01:10:17,399
be able to remember the name of one of

1601
01:10:13,139 --> 01:10:19,469
them what happens if a simple energy

1602
01:10:17,399 --> 01:10:26,578
source is invented and one was called

1603
01:10:19,469 --> 01:10:29,460
brown shoe where the hippie living was

1604
01:10:26,578 --> 01:10:32,099
girlfriend figures it out and he has to

1605
01:10:29,460 --> 01:10:34,739
on then spend ten years going back and

1606
01:10:32,099 --> 01:10:36,420
getting a PhD and becoming part of his

1607
01:10:34,738 --> 01:10:40,468
father's company and wearing suits and

1608
01:10:36,420 --> 01:10:42,300
ties and slowly injecting this into

1609
01:10:40,469 --> 01:10:45,448
society until it can't be stopped

1610
01:10:42,300 --> 01:10:47,699
because he realized that um reputation

1611
01:10:45,448 --> 01:10:50,419
is everything for for alternative

1612
01:10:47,698 --> 01:10:52,678
science that it would be easily stopped

1613
01:10:50,420 --> 01:10:56,460
anything you could think of to do it it

1614
01:10:52,679 --> 01:10:59,510
would be easily stopped except to have

1615
01:10:56,460 --> 01:11:02,868
it be a slow business development so

1616
01:10:59,510 --> 01:11:06,810
just just not suppression but just um

1617
01:11:02,868 --> 01:11:08,639
disbelief and Prejudice it's probably a

1618
01:11:06,810 --> 01:11:12,000
much bigger bigger than we think even if

1619
01:11:08,639 --> 01:11:13,710
we have something to sell you can then

1620
01:11:12,000 --> 01:11:15,539
be jailed because everybody knows it

1621
01:11:13,710 --> 01:11:21,539
doesn't exist and you're running a scam

1622
01:11:15,539 --> 01:11:24,599
like de Forest was almost jailed for

1623
01:11:21,539 --> 01:11:29,578
pretending that the the diode vacuum

1624
01:11:24,599 --> 01:11:32,750
tube could be part of a radio but that

1625

01:11:29,578 --> 01:11:38,549
was one hyman story another one was a

1626
01:11:32,750 --> 01:11:41,158
space opera type where a worship that

1627
01:11:38,550 --> 01:11:44,099
had gone out to the planets to dig

1628
01:11:41,158 --> 01:11:46,769
uranium came back 50 years later and all

1629
01:11:44,099 --> 01:11:49,500
the cities were abandoned and that was

1630
01:11:46,770 --> 01:11:52,199
because a little electromagnetic device

1631
01:11:49,500 --> 01:11:55,109
was discovered that you could run your

1632
01:11:52,198 --> 01:11:57,988
your farm implements by building this

1633
01:11:55,109 --> 01:12:03,179
thing with several coils so after all of

1634
01:11:57,988 --> 01:12:04,649
the changing the economy died down it

1635
01:12:03,179 --> 01:12:06,969
was all turning communities no big

1636
01:12:04,649 --> 01:12:10,538
cities so that was his his

1637
01:12:06,969 --> 01:12:14,710
of what energy device would do to

1638
01:12:10,538 --> 01:12:19,059
society I'll just quickly one third one

1639
01:12:14,710 --> 01:12:21,880

is that I know of is the bomb on and the

1640

01:12:19,059 --> 01:12:25,320
method nita society community in

1641

01:12:21,880 --> 01:12:28,090
Switzerland I think it is yes that he

1642

01:12:25,319 --> 01:12:29,978
apparently has a device could be a hopes

1643

01:12:28,090 --> 01:12:31,360
you know it could be maybe has something

1644

01:12:29,979 --> 01:12:33,159
he doesn't know how it works or maybe

1645

01:12:31,359 --> 01:12:36,279
it's exactly what he thinks that he

1646

01:12:33,158 --> 01:12:37,689
won't let anybody else find out about it

1647

01:12:36,279 --> 01:12:40,268
because he's convinced that it would

1648

01:12:37,689 --> 01:12:42,279
take down civilization they think the

1649

01:12:40,269 --> 01:12:44,248
world is not ready for it right it's

1650

01:12:42,279 --> 01:12:46,748
actually a religious community that

1651

01:12:44,248 --> 01:12:48,309
they're keeping it to themselves or they

1652

01:12:46,748 --> 01:12:50,408
think that if they release it that that

1653

01:12:48,309 --> 01:12:54,670
the the mass death that the changes

1654
01:12:50,408 --> 01:12:58,899
would cause is too much to have on their

1655
01:12:54,670 --> 01:13:01,510
conscience but the front bomb their

1656
01:12:58,899 --> 01:13:03,339
research about such devices going on but

1657
01:13:01,510 --> 01:13:06,059
to my knowledge none of them have been

1658
01:13:03,340 --> 01:13:09,849
completely successful to any

1659
01:13:06,059 --> 01:13:12,760
demonstrable or alive are repeatable

1660
01:13:09,849 --> 01:13:15,610
extent all right if it was then we don't

1661
01:13:12,760 --> 01:13:18,190
rehab them of course I mean if it was

1662
01:13:15,609 --> 01:13:20,920
real well cold fusion is real but it

1663
01:13:18,189 --> 01:13:22,719
lacks the of the financial backing that

1664
01:13:20,920 --> 01:13:25,719
needs to develop it to get out to

1665
01:13:22,719 --> 01:13:32,859
commercial levels yeah oh you're only

1666
01:13:25,719 --> 01:13:36,038
partly right but not completely well I'm

1667
01:13:32,859 --> 01:13:38,139
I want to go back to what dan brought up

1668
01:13:36,038 --> 01:13:39,578
that the question of and appreciate that

1669
01:13:38,139 --> 01:13:42,190
we know we do need to ask this question

1670
01:13:39,578 --> 01:13:46,599
of why are we developing greater and

1671
01:13:42,189 --> 01:13:48,578
greater energy sources and i do i think

1672
01:13:46,599 --> 01:13:51,059
i agree with you Dan that if we do that

1673
01:13:48,578 --> 01:13:53,889
it would create many problems such as

1674
01:13:51,059 --> 01:13:55,479
not having any scarcity you know we

1675
01:13:53,889 --> 01:13:58,618
would not have any consequences for our

1676
01:13:55,479 --> 01:14:01,900
actions and it could be like you said

1677
01:13:58,618 --> 01:14:03,189
sort of catastrophic or dangerous given

1678
01:14:01,899 --> 01:14:06,009
the human condition as it currently

1679
01:14:03,189 --> 01:14:07,478
stands so I think the most important

1680
01:14:06,010 --> 01:14:09,849
thing even more important in finding

1681
01:14:07,479 --> 01:14:11,019
more energy is to change the human

1682

01:14:09,849 --> 01:14:12,578
consciousness or the state of our

1683
01:14:11,019 --> 01:14:14,469
society so that we could deal with that

1684
01:14:12,578 --> 01:14:16,478
energy because with greater energy comes

1685
01:14:14,469 --> 01:14:17,750
greater power and you know we don't

1686
01:14:16,479 --> 01:14:20,480
necessarily have the

1687
01:14:17,750 --> 01:14:23,779
to deal with that power at this point so

1688
01:14:20,479 --> 01:14:26,359
I for I think both teams of research

1689
01:14:23,779 --> 01:14:29,689
going on you know looking at the model

1690
01:14:26,359 --> 01:14:31,699
of Einstein suggesting to President

1691
01:14:29,689 --> 01:14:35,719
Roosevelt about looking into nuclear

1692
01:14:31,699 --> 01:14:37,519
bombs in World War two with no intention

1693
01:14:35,720 --> 01:14:39,890
of that starting a nuclear arms race how

1694
01:14:37,520 --> 01:14:41,360
do we as physicists take responsibility

1695
01:14:39,890 --> 01:14:43,280
for the fact that especially in our

1696
01:14:41,359 --> 01:14:46,789

current world when we do invent an

1697

01:14:43,279 --> 01:14:48,380

important discovery the first people

1698

01:14:46,789 --> 01:14:51,619

interested in it are probably the US

1699

01:14:48,380 --> 01:14:53,300

government for military purposes and how

1700

01:14:51,619 --> 01:14:54,649

do we deal with you know the fact that

1701

01:14:53,300 --> 01:14:56,779

we also take some responsibility for

1702

01:14:54,649 --> 01:14:58,039

that and there's no one controlling the

1703

01:14:56,779 --> 01:15:00,019

use of these things some of these new

1704

01:14:58,039 --> 01:15:02,420

energies will be benign and what I've

1705

01:15:00,020 --> 01:15:05,240

been talking about in in Daniel 2 is

1706

01:15:02,420 --> 01:15:08,539

very difficult to imagine it being

1707

01:15:05,239 --> 01:15:10,729

weaponized ball though it can be useful

1708

01:15:08,539 --> 01:15:12,739

very useful practical somewhat good

1709

01:15:10,729 --> 01:15:14,569

concentration energy levels it's not

1710

01:15:12,739 --> 01:15:16,729

high enough to for the military to take

1711
01:15:14,569 --> 01:15:18,469
interest in it I'm not sure sir you

1712
01:15:16,729 --> 01:15:21,409
could probably make warships and

1713
01:15:18,470 --> 01:15:23,750
submarines which which could use

1714
01:15:21,409 --> 01:15:26,059
seawater and and basically have high

1715
01:15:23,750 --> 01:15:28,220
power density motors and cipher ghazal

1716
01:15:26,060 --> 01:15:32,090
nanotechnology is much more dense and

1717
01:15:28,220 --> 01:15:33,770
that census right but your points

1718
01:15:32,090 --> 01:15:35,180
well-taken I don't know whether we

1719
01:15:33,770 --> 01:15:36,590
should or not I mean I've considered

1720
01:15:35,180 --> 01:15:38,510
abandoning my research for this reason

1721
01:15:36,590 --> 01:15:40,730
but in the but in the short term I think

1722
01:15:38,510 --> 01:15:42,590
the energy deliver were in and the and

1723
01:15:40,729 --> 01:15:45,439
the environmental damage we're doing to

1724
01:15:42,590 --> 01:15:46,850
the world especially wiping out roughly

1725
01:15:45,439 --> 01:15:48,319
half the species within the next hundred

1726
01:15:46,850 --> 01:15:52,160
years which is which would make us a

1727
01:15:48,319 --> 01:15:53,569
mass extingisher of life I think is the

1728
01:15:52,159 --> 01:15:55,340
greatest crime there is and I think in

1729
01:15:53,569 --> 01:15:57,920
the short term a new energy source is

1730
01:15:55,340 --> 01:15:59,840
almost essential to forestall this or

1731
01:15:57,920 --> 01:16:01,420
eliminate the possibility but in the

1732
01:15:59,840 --> 01:16:04,100
longer term is what I'm worried about

1733
01:16:01,420 --> 01:16:05,329
and so I've teetered about whether I

1734
01:16:04,100 --> 01:16:09,200
should walk away from this or not but

1735
01:16:05,329 --> 01:16:11,090
I'm not going to and one other safeguard

1736
01:16:09,199 --> 01:16:12,529
to some extent is when several of us

1737
01:16:11,090 --> 01:16:15,500
have said

1738
01:16:12,529 --> 01:16:18,500
Daniel that we need to just publish our

1739

01:16:15,500 --> 01:16:19,939
results because if we put it out to

1740
01:16:18,500 --> 01:16:23,060
everybody in sort of a level playing

1741
01:16:19,939 --> 01:16:27,079
field and at that point we can hope that

1742
01:16:23,060 --> 01:16:29,150
the good outweighs the bad I'm intrigued

1743
01:16:27,079 --> 01:16:34,149
by what Daniel said when you said just

1744
01:16:29,149 --> 01:16:38,109
about the negative consequences of

1745
01:16:34,149 --> 01:16:40,969
ubiquitous energy not in too much and I

1746
01:16:38,109 --> 01:16:42,589
imagined that there are two stages with

1747
01:16:40,970 --> 01:16:44,990
this as there are with many things and

1748
01:16:42,590 --> 01:16:46,010
that is as you develop more of it well

1749
01:16:44,989 --> 01:16:48,289
the first thing that's going to happen

1750
01:16:46,010 --> 01:16:49,789
is everybody's going to get an SUV and

1751
01:16:48,289 --> 01:16:53,659
my little car I won't be able to see out

1752
01:16:49,789 --> 01:16:56,449
it's always sad and then people will do

1753
01:16:53,659 --> 01:16:58,460

what Daniel said and you know will rape

1754

01:16:56,449 --> 01:17:02,109

the oceans and do various other things

1755

01:16:58,460 --> 01:17:04,520

but that's sort of a scarcity mentality

1756

01:17:02,109 --> 01:17:07,489

finally when we moved beyond that

1757

01:17:04,520 --> 01:17:09,920

scarcity mentality that's when we can

1758

01:17:07,489 --> 01:17:12,649

become a more civilized civilization and

1759

01:17:09,920 --> 01:17:16,940

we can deal with actually having a

1760

01:17:12,649 --> 01:17:19,009

greater degree of power and and the lack

1761

01:17:16,939 --> 01:17:20,329

of scarcity and I say this you're going

1762

01:17:19,010 --> 01:17:23,600

to laugh because it sounds like a joke

1763

01:17:20,329 --> 01:17:25,460

but I don't mean this as a joke I know

1764

01:17:23,600 --> 01:17:27,890

what it's going to be like in the 23rd

1765

01:17:25,460 --> 01:17:32,630

or 24th century because I watched Star

1766

01:17:27,890 --> 01:17:35,360

Trek in particular the concept of the

1767

01:17:32,630 --> 01:17:37,430

replicator is fascinating because with

1768
01:17:35,359 --> 01:17:39,619
the replicator everybody can have as

1769
01:17:37,430 --> 01:17:42,800
much of anything as they want so things

1770
01:17:39,619 --> 01:17:44,989
have no intrinsic value anymore and at

1771
01:17:42,800 --> 01:17:46,699
first probably when the first person

1772
01:17:44,989 --> 01:17:48,019
will build the replicator you know he'll

1773
01:17:46,699 --> 01:17:48,970
use it for all sorts of terrible things

1774
01:17:48,020 --> 01:17:51,040
and build up

1775
01:17:48,970 --> 01:17:52,960
collect demise early and collect all

1776
01:17:51,039 --> 01:17:55,090
sorts of stuff but eventually when

1777
01:17:52,960 --> 01:17:57,189
everybody's got a Replicators at that

1778
01:17:55,090 --> 01:17:58,779
point we'll be able to deal with it we

1779
01:17:57,189 --> 01:18:00,399
won't have this hair city mentality

1780
01:17:58,779 --> 01:18:01,989
there's a historical precedent to

1781
01:18:00,399 --> 01:18:05,139
actually answer that a little bit and it

1782
01:18:01,989 --> 01:18:07,239
has to do with population every single

1783
01:18:05,140 --> 01:18:09,039
nation on this planet regardless of race

1784
01:18:07,239 --> 01:18:12,630
or culture when they get a certain

1785
01:18:09,039 --> 01:18:16,000
degree of material sufficiency stops

1786
01:18:12,630 --> 01:18:17,980
blossoming their population that is an

1787
01:18:16,000 --> 01:18:19,239
example of we've learned how to get

1788
01:18:17,979 --> 01:18:20,619
beyond the scarcity we need more

1789
01:18:19,239 --> 01:18:24,179
children need more children to take care

1790
01:18:20,619 --> 01:18:26,529
of us if I only say enough we're okay I

1791
01:18:24,180 --> 01:18:30,420
do put a little bit of hope in humanity

1792
01:18:26,529 --> 01:18:30,420
that we might turn the corner that way

1793
01:18:32,729 --> 01:18:37,839
just a brief aside in regard to some

1794
01:18:35,770 --> 01:18:40,570
earlier comments about Tesla given

1795
01:18:37,840 --> 01:18:43,029
research that has been seen in SSC and

1796

01:18:40,569 --> 01:18:44,739
elsewhere about biological effects of

1797
01:18:43,029 --> 01:18:46,630
low frequency radiation I think we

1798
01:18:44,739 --> 01:18:48,609
should be grateful that he was not

1799
01:18:46,630 --> 01:18:54,550
allowed to start the entire Earth

1800
01:18:48,609 --> 01:18:57,189
resonating at eight Hertz but on on to a

1801
01:18:54,550 --> 01:18:59,440
question for the panel um that we've

1802
01:18:57,189 --> 01:19:04,539
been doing some brainstorming about the

1803
01:18:59,439 --> 01:19:07,359
effects of having all of these compact

1804
01:19:04,539 --> 01:19:10,689
energy sources in as much abundance as

1805
01:19:07,359 --> 01:19:13,779
they're needed up but how slow and

1806
01:19:10,689 --> 01:19:16,119
painful is it going to be to get there I

1807
01:19:13,779 --> 01:19:21,789
don't know how much is EPF box costs to

1808
01:19:16,119 --> 01:19:26,289
build but uh it sounds like if the semi

1809
01:19:21,789 --> 01:19:28,600
conductor based approach for a second

1810
01:19:26,289 --> 01:19:32,350

law device pans out we're talking about

1811

01:19:28,600 --> 01:19:33,970

something like a coffee can full of what

1812

01:19:32,350 --> 01:19:35,530

amount to microchips that cost something

1813

01:19:33,970 --> 01:19:37,990

like a hundred dollars an ounce to

1814

01:19:35,529 --> 01:19:40,269

manufacture how rapidly can this

1815

01:19:37,989 --> 01:19:42,519

technology be distributed how how

1816

01:19:40,270 --> 01:19:44,290

quickly do you foresee it spreading I've

1817

01:19:42,520 --> 01:19:47,380

heard historically it takes 40 years for

1818

01:19:44,289 --> 01:19:48,609

any new technology to take hold so if

1819

01:19:47,380 --> 01:19:51,760

you if you look at something like the

1820

01:19:48,609 --> 01:19:53,679

nuclear industry at the time December 42

1821

01:19:51,760 --> 01:19:56,020

and Fermi started the first atomic pile

1822

01:19:53,680 --> 01:19:57,460

to when nuclear power plants became

1823

01:19:56,020 --> 01:20:00,080

ubiquitous it was 30 years something

1824

01:19:57,460 --> 01:20:01,819

like that but that was a crash course so

1825
01:20:00,079 --> 01:20:03,680
point energy I've actually priced it out

1826
01:20:01,819 --> 01:20:05,779
because we've talked to investors in

1827
01:20:03,680 --> 01:20:10,369
various other people and it ends up that

1828
01:20:05,779 --> 01:20:13,279
a kilowatt system is far less than a

1829
01:20:10,369 --> 01:20:17,630
hundred dollars and it's producible with

1830
01:20:13,279 --> 01:20:20,239
today's technology just to give you

1831
01:20:17,630 --> 01:20:23,000
specifics we need lots of little

1832
01:20:20,239 --> 01:20:25,130
nanotubes and so on it's essentially a

1833
01:20:23,000 --> 01:20:27,649
CD technology so the way that you make

1834
01:20:25,130 --> 01:20:30,199
cds or dvds and stamp them out we make a

1835
01:20:27,649 --> 01:20:32,000
stack of 20 of those it requires a pump

1836
01:20:30,199 --> 01:20:34,909
the pump is pretty much the same as

1837
01:20:32,000 --> 01:20:38,350
you'd use in an aquarium and a few

1838
01:20:34,909 --> 01:20:38,349
additional things it's pretty cheap

1839

01:20:39,359 --> 01:20:46,838

somehow I guess this would be a very

1840

01:20:41,979 --> 01:20:49,599

stimulating evening okay it's now nine

1841

01:20:46,838 --> 01:20:52,019

o'clock so maybe we should adjourn thank

1842

01:20:49,599 --> 01:20:52,019

you for coming