[Music]
okay
here we are at the end lecture number
20.
so many thanks for having sat through
the last
19 and well i hope you sat through the
last 19 and listened to them all
and this one as i promised last time
will also be on the climate crisis
although not what it is the way 19 was
but what each of us can do about it
as i mentioned before you know how this
dovetails
what we've been doing and how this is
really a natural
ending for the course is because we saw
so many um texts and ideas and
traditions that sort of came
together and were sort of full-blown
with henry david thoreau
with respect to as i mentioned before
something like consumerism
like say sir john denham
um how he impacts thoreau's thinking
how someone like ben johnson impacts the
row
yeah all that and the whole tradition
itself
you know really is something of which
it's road when or where
so thoreau is kind of a mash-up of that
and you can argue he's even sort of a
little mash-up of buddhism too he's
familiar with eastern traditions and
he certainly references them in walden
but
what i find interesting about thoreau
and the buddha too
is that they both were trying to just
figure out what the good life is and and
not just

you know figure it out in some academic sense and kind of that's what ben johnson does right like what would a really proper dwelling for a person be like he thinks about it and so does andrew morbell for example but you have here with um thoreau and the buddha to not just think about it but to live that life and to to ask the question what is the good life in very practical terms and then set out to live it and then each confirmed that especially the buddha that that life is the most rewarding of lives that is the life that we should live so the question then for us in the third and you know um decade of the 21st century is what would that mean not so much personally spiritually and thoreau and the buddha both have you know that in mind but also environmentally and specifically in terms of the climate crisis so that's what we'll be looking at today in other words thoreau sits down and says you know what would the best place to live be like you know he thinks about that and ultimately winds up on his cabin he thinks about clothing he thinks about the food that he eats you think about all these very practical things and that only a thorough thoroughgoing modest might focus on that way right if you're a dualist you might sort of pull away from the body and houses and food and all that i think it's just unimportant because you're

at root a spiritual being but thoreau
and the buddha
saw themselves as physical beings in a
physical world and this was the life we
have
and they wanted to figure out what the
best way of living that life would be
so we're going to jump right into that
but i will note first
i wanted to sort of give you an
understanding because we talked so much
about the climate crisis and you
do have some understanding of the
politics behind it for sure
having read the um having watched that
documentary
climate of doubt but i wanted to let you
know where we stand right now
in the u.s politically with respect to
the um climate crisis or specifically
where we stood after we were pulled out
of the um
the paris accord by um president trump
so here we are ah quite an occasion
we're
started here moved all the way up
um almost 5 000 years of literature
and moved all the way over
not only across europe across north
america but then into
to asia and the influence of western
thinking on
asia but here we are
the climate crisis what each of us can
do about
it
so let's take a poll you know do you
believe
that we can save the planet and and by
that
you you whenever you say that you really
mean save the planet for humanity the
planet is going to continue on

regardless of what we do or don't do
but um and life will continue on i mean
even if we had a horrible extinction
event like the permian triassic event
252 million years ago
it is the case that some life will go on
but can we save it for
human beings and that's the question
and i'm going to let you answer it and
maybe you'll think a little differently
after the end of the lecture i don't
know but
okay so we're still in
so most americans um you know people are
aware that president trump pulled us out
of the
the paris agreement so first off just
give you a little understanding what
that was
and that is um in 2015
december at cop21 which is the 21st of
these
annual meetings that have happened where
nations of the world have come together
to talk about the climate crisis
very auspicious one cop 21 because
quote all nations came into into a
common cause to undertake ambitious
efforts to combat climate change and to
adapt to its effects as such it charges
a new course
in the global climate effort so
what happened there almost 200 nations
of the earth all the nations of the
earth came together
and this is not during the trump
administration but if you note the date
there december 2015 that's
it's about a year before president trump
was elected
barack obama represented the u.s
nations came together and agreed to do
what they could

to reduce the climate crisis
specifically the paris agreement central
aim is to strengthen the global response
to the threat of climate change by
keeping a global temperature rise
this century well below 2 degrees
celsius above pre-industrial levels
and to pursue efforts to limit the
temperature increase even further to 1.5
degrees celsius
that's a very ambitious aim right off
the bat because remember
i know that global temperature has
already risen by one degree celsius
1.8 degrees fahrenheit so to to try
to reduce it to 1.5 um i i would say
more than am
and ambitious is just uh un impossible
and i'm
also put it um even 2.0 is barely
possible i would argue and maybe 2.5 is
the best but
look regardless of where we hold it we
have to do
everything that we possibly can to
reduce it to those levels and by setting
such a low level
at cop21 they really were suggesting
that the nations of the earth
do what they could by the way just a
little framing of this
cop21 it did not go into any specifics
so this is very general language i just
read
there is only general language in it
what i mean by that
it's not like um cop 21 said you know
every nation
should adapt solar to the extent that 25
percent of its electric grid is
solar-powered
nothing like that and it's really an
acknowledgement that you know

different nations developing nations you know nations like the us that are well developed
we have different sorts of problems and we know that last time i closed last time
you know the big challenge the u.s has for example in other developed countries is that we have to dramatically reduce our co2 emissions and we're going to talk about how we can do that today
but you know that's different than than say the
parallel countries i was looking after you know all those countries of africa
um again i really hate doing that and you know talking about africa all at once but
it was a good comparison to us because of the racism thing
but the other thing about that is you know africa
has very low emissions you know not every country is the same
i know but um they have to increase in africa those emissions so
africa has a different sort of challenge altogether and that is how to develop and that's going to be a different kind of challenge than the sort of degrowth that we need to do in the united states
so the paris accord is leaving it to individual
countries to do the other thing to note about the paris accord which is important
there's no enforcement mechanism here so it's not like
you know even if the u.s had stayed on board for the paris agreement
that the you know the international community
community could have forced us to to

keep our emissions down to try to meet
these goals there is there
has no teeth to it in that way but it's
still very important and the best that
we have today
and again with the exception the us
other
you know all the other nations are at
least in theory and spirit along with
this
so the u.s of course is the only nation
that has pulled out and that's
that's depressing and embarrassing and
kind of feel ashamed of being an
american for that reason especially
as you know the u.s you know contributed
so much
to the climate crisis um
but you know almost half americans and
about most um are still committed to the
paris agreement through
a variety of movements like the worst
stolen movement so what's the worst
storm movement
this is signed we the undersigned mayors
county executives governors tribal
leaders college and university leaders
businesses face groups and investors are
joining forces for the first time to
declare that we will continue to support
climate action to meet the paris
agreement so what happened was
after you know we officially pulled out
by way of the president as a nation
a group of governors for example
including
the then governor of california jerry
brown who was one of the
people organizing this along with mayors
county executives tribal leaders college
and university leaders and we'll talk
about how the uc in particular ucsb
was involved in this all these groups

came together
and said we're still in that's why it's
hashtag we're still in
we're still in one we're still in the
paris agreement we will do everything we
can
and you can see why like a city and and
many of the big cities in the us which
are you know have huge populations
compared to the entire
you compared to anywhere else in in the
us and and together
very significant which is why if you add
up all those groups you
just laid out here you're you're pushing
half the
population in the u.s you know cities
said that we're
we're still in we're going to do
everything that we can
um at the city level and and that could
be really significant like mass
transportation
and and all um to stay in the paris
agreement
and something like california it could
be really significant right so
one in eight people in the us who lives
in the us
lives in california you have 400 we have
40 million people
and moreover you know our economy is
huge um i'll note here but i'll just say
it's like the fifth largest economy
on the uh the planet so if california is
still in
um it's really significant and and in in
real practical ways too so we can for
example
you know set um deficiency standards of
automobiles
and you know require a certain amount of
electric automobiles and things

like that well we're so big in
california
that you know when we do that the
automakers stand up and notice
because you know if they if they can't
meet a standard that we would set
they're going to miss the opportunity to
sell to a population of 40 million
people which is you know bigger than a
lot of countries
so as a consequence there's there's
kind of real teeth to this so we
continue
um governor brown signed it at the time
so california is still
uh is in we're still in and our
subsequent given governor newsom was
still in too
um i just thought i'd rattle off a few
here in terms
of california and more importantly
more importantly or more to home to uc
so janet napolitano
president at the time of the university
of california
she put the whole uc in as a consequence
but individual chancellors wanted to you
know underscore
that they were really on board for this
as well so henry yang who's the
chancellor of ucsb
put ucsb in and you know the cities
locally here goleta and santa barbara
are both still
in and they have pretty ambitious um
goals like in
um and we'll see in santa barbara so
if you're here in california and living
in goleta
going to a uc campus ucsb
in a whole range of different number of
different ways you're still in too
so you're you're in you know

ins you're in a you know school and in a community
and in the state where we're still committed
to cop21
yeah um so how does this work
in in practice right so it's one thing
to say you're in but again since there's no enforcement no specifics it does
raise a question
what does it mean to be in well california
right now and gets um more than thirty percent over the slide a little bit ago
of its electricity from renewables
and even higher in peaks and i note here at one point
in 2017 80 of california's total
electricity came from renewable sources
why was it so high when it's on average lower well look at night we get less
because we don't
you know have solar available and solar is a big part of our
renewable picture here in california but where we get it from
is solar we have some wind resources but not all that many at this point in time
so
states like wyoming they don't have as much solar where they have a lot of wind
we have a lot of solar not the wind
that may well change i we hope it changes in so far
as you know we have a very long coast
and we have enormous wind resources off the coast
so as as offshore um
wind turbines become more effective
and more inexpensive if we develop that we will have a lot of
wind resources here too but we don't
right now we have a lot of hydroelectric

and we get that we develop right on
in the state itself with their own dams
and um
electricity generating plants hydropower
plants but
also there's the hoover dam and the
colorado river and the electricity we
get from there
and also people aren't aware always if
you'd heard of if you know geothermal
which is using the heat of the earth to
basically heat steam to turn turbines to
create electricity
you know the go-to example for that is
always iceland but the fact is
the number one country on the planet
using geothermal is the united states
and the number
one state using geothermal is california
in fact if california were again a
country
we would be producing more geothermal we
currently are producing more geothermal
than any other country and that's
important because
hydroelectric and geothermal you can
kind of turn the switch on those as you
need them
so in other words solar you don't have
at night wind varies a little although
offshore can be would be more consistent
but you know you always have
hydroelectric and you always have
for the most part geothermal available
like even at night even when it's a
cloudy day or whatever
um and you can see we're still in closer
to home um
so back in um 2011
um first off that's a
typo there that should say 2025.
but back in 2011 janet napolitano the
president of the uc

um said made a commitment that the uc
system would be carbon neutral by 2025
so we're very close to that now
and it's it's not quite accurate to be
totally honest
in that yes it's all the buildings it's
the dorms and the
labs and the classrooms and even the
vehicle fleet on campus
but it doesn't take into account um air
travel that
faculty due to and staff due to
conferences and meetings
as well as the commuting of faculty and
staff and students to campus
they right now constitute about a third
of the problem
that that kind of commuting that kind of
um
transportation really so i've been
working on that personally
um putting for the last five
years um trying to work on a model of
remote conferencing you know online
conferencing that would
be in fact better than traditional ones
so it's been kind of a hard sell
but anyhow there has been this real
commitment on the part of the uc
2b carbon neutral
and note here that ucsb will likely be
one of the campuses to meet that goal in
other words of all the uc campuses i
think you know between us it's it's
clear that not everyone
of those campuses will be able to meet
it but you ucsb may well meet it
and you may have have seen things like
you know on campus
you've seen the solar installations
mostly they're on top of buildings so
you may not have noticed them but
if you look around on campus you'll see

like on top of parking structures and
all you'll see them
um but some of the issue you won't see
unless you just happen to be um
like at a looking down from from a
higher building
yeah santa barbara has committed to
becoming 100 renewable by
2030. um also a a major goal
and these are worth underscoring for a
moment
you know so again there is that issue
with air travel in particular with ucsb
but the fact that we're going to be
carbon neutral by 2025 the fact that
santa barbara the city hopes to be
carbon neutral by 2030.
you know you've you've probably heard an
awful lot about the green new deal and
how radical it is and how you know
expensive it's going to be
and how you know impractical and it
could never happen
um well the green new deal i was hoping
you know to get us
as a country you know to be off of um
fossil fuels on the renewables
by 2030. so um and this
speaks to the worst dual in movement you
know um
yeah not only is that a possible goal
you know that we could actually reach
but you know we're actually even going
to beat it here in the um
the uc and ucsb in particular and
you know cities like santa barbara are
going to do it as well
you know how they do it just because i
happen to be
connected to transportation um i'm
co-director of the transportation
committee on campus um
i know for example that santa barbara is

spending like you know over 50 million dollars
to to put in effect a but new bicycle master plan that they approved in 2016.
so how this works is and you can see it directly
how it will directly impact something like climate crisis
um well the first street that was part of the um
the new master plan was coda downtown
i don't know if you know the street doesn't matter it's if you go to the saturday morning farmers market it's the street that runs by there
but it was a very typical street it has parking on both sides of the road
and it has two lanes one going one way one going the other way
well in this new plan which they've subsequently developed
they took away the parking on one side
and they put a very nice bicycle path there and it's reasonably protected because it has like little um not cones but like little pylons separating it from traffic
so it's pretty safe and it feels pretty safe to be there because you are separated from traffic
when you think about it it did two things and you know one fell swoop there one you cut the parking in half so if you
have a car suddenly it became very much less convenient to have a car
because you know you don't have a place to park
it you have to drive around trying to find a parking space it gets to be more and more of a hassle
but on the flip side having a bike becomes more and more

practical and reasonable and fun because
you know you suddenly have
ways of very quickly getting around town
and and
by the way i would add more quickly and
especially in town you get around the
bike when i
and i lived in um cambridge
massachusetts which is right next to
boston i used to
always tell everyone and it was true i
could get anywhere
in that town faster on my bike than you
could
any other way so like with the car yeah
this new contest because you know
there's a lot of stop and go traffic at
lights and everything
well cars are all backed up waiting for
the the light but i could move right to
the
you know front of the line and then you
know jump right out
when that light changed if you go if you
take mass transit which is great
but still time you go down the subway
you get on the subway you wait for the
subway and everything you know by the
time you do all that i'm already there
so and even buses which moved quickly
have the same problem because they don't
have dedicated bike
bus lanes in boston yet so
anyhow real commitment um
locally to the we're still in movement
so it makes clear that businesses and
institutions like
ucsb um can make meaningful global
interaction
but it also underscores the importance
of you know federal state
local political action so
one thing we we often don't think about

you know we have a big um
we have these big you know um
presidential elections
obviously they're super important but we
also have to remember
that local elections local politicians
local political action
is really important as well because you
know
you may not have thought about the
council members that you were voting on
when you
you know when they were elected for
santa barbara but you look what they've
done
and and really kind of you know where
the rubber hits the ground where
things actually are happening um
it's there like in little towns and
cities and all where
where people were working out the nuts
and bolts of how to deal with the
climate crisis
in little ways seemingly in significant
ways like putting in bikes
bicycle paths but if you think about it
you know santa barbara
is dedicated to to is committed to a
process of
slowly you know removing automobiles
from the american scene which which
really has to happen with the climate um
to address the climate crisis
so um people often ask me and i'll end
with this part here
um you know if you could do if they
could do just
one thing right because you know in fact
we're going to talk about a whole range
of things you could do right now
to help mitigate the climate crisis but
if you could do just one
you know what would that one thing be

and i think people expect me to say
things like you know stop eating beef
get rid of your car or something like
that
both good by the way but the number one
thing that you can do
and i always tell people you're in luck
because it just takes an hour
of your time a year or so and that is to
vote
and to vote with the climate crisis in
mind and
that's increasingly easy because many
politicians
are are are talking about it and making
it very
explicit you know how they feel about
the climate crisis and
others aren't talking about it at all
and um well when it comes to casting
your vote that should tell you something
too
if they're not prioritizing this issue
at least in some way
um yeah that kind of speaks volumes
itself
um yeah i'll leave this one up to you
will you intend to vote at the next
election whichever that one is
um hopefully we'll oops go back to this
um i just wanted to throw this out here
another way of being active is to
become an activist so if you're
interested in
in activism on campus in any way
just you know put ucsb sustainability
into your um your browser or get
involved
students and you'll suddenly see all
sorts of things like this here
opportunities on campus and beyond just
that
my slides are all off today

here are a few ucsb i call them eco
organizations that you could join you
also get them through the ucsb
sustainability website
so that is the the website so if you put
in like ucsb
climate change and all it won't you
won't get directly where you need to go
ucsb
the sustainability office is the the one
that handles all this and
they do a great job of things like
keeping these lists up to date
so that and some of these you may know
about
already like associated students
recycling
um that's you know um
[Music]
you see folks on campus actually going
and getting the recycling involved you
can become involved with
all sorts of things here at ucsb
so if you you want to be still in there
are things you could do as well
okay we're going to go through a number
of things now
like transportation and why we're doing
this
is we're going to talk about personal
impact
and these are the things that
thoreau talked about um and
buddha after less two but sometimes more
theoretical so
thoreau for example um in walden talks
about the idea
that it's for him it's it's almost
easy it was easier and less expensive
just to walk where he wanted to go
and why he takes that position is that
if he were to get a job and to get the
money that he would need to get a you

know
at the time a train ticket the amount of
time that he would have taken
to work to make that money he could have
just walked there
and he says he finds that more enjoyable
sounds like an odd argument but in fact
well something i want to tell you about
in a moment but i'll say it now and to
frame this out with tarot
you know the average american works
about one day a week to pay for their
car
to own a car one day a week to own a car
so you kind of have to ask yourself a
question here and again i'm not even
talking about anything environmentally
i'm going to tell you about the carbon
footprint of a car which is
kind of crazy but just thoreau's
argument there
think about it if you didn't have a car
every weekend for the rest of your life
could be a three-day weekend
because you wouldn't have to work that
friday
that one day a week to have a car um
it sounded like a silly argument when
toro says it but when you think of it
this way
yeah people have also approached it the
other one another way
and um imagining and you know if you're
college age
this could apply to you that when you
hit the job market
if instead of buying a car you took that
amount of money every month that it cost
to have a car i'm going to show you in a
minute it's like 750
a month for the average american if you
put that in a retirement fund
starting when you entered the workforce

you would not
have to wait to you're 65 to retire you
could retire
in your late 40s so people often say
that cars are like this wonderful
freedom you can get in
the middle of the night you can drive to
7-11 and get ice cream
yeah yeah okay that's freedom i guess
but
it seems to me there's an enormous
amount of freedom
in having you know an extra day off a
week
or you know having you know more than a
decade
of extra time to to enjoy life once you
retire
but anyhow let's go through
transportation
so this is um
where the average americans carbon
emissions come from
and just to so you know where this comes
from this is the union of concerned
scientists so this is a um a very
credible
group the union of concerned scientists
if you go to their website if you have
questions often about
something like individual carbon
emissions or
or climate crisis or something they're a
very good place to go because you will
get reliable information
and there's so much disinformation and
intentionally being spread by fossil
fuel affiliates out there
that you know it's nice to be able to
find something credible
so here are their numbers and we're
looking at transportation now
notice that transportation is the

biggest chunk here
and this is again if you're an average
american this is your carbon footprint
it's probably not exactly yours because
you know you may not have a car
you may have a car maybe larger you
might commute
pretty far to ucsb or go home every
weekend or something
or the one that would really throw this
office if you fly
there are some ucsb faculty that this
constitutes like all of that leaving
just this for the rest of their life and
i mean that
um literally and that's because when you
fly you emit an enormous amount of
greenhouse gases and with like
professors who fly to multiple
conferences every year
you're flying like you know six eight
major flights a year
that could be it could be three quarters
of your carbon footprint but anyhow if
you're an average american that's it
notice that if you put housing together
here and we're going to get to that
that these two together would be
slightly larger
stuff that you buy another big chunk
and food and other big chunks so we're
going to look at these individually
starting now with transportation
we're going to do your house here your
stuff here
and your food let's do transportation
first
it's the single largest co2 emitter and
again depending on how you calculate the
house
and for many people driving a car does
constitute
you know a little more than a quarter of

their carbon footprint so
if you're thinking about you know low hanging fruit here
it's like what could you do to to significantly reduce your carbon or climate footprint
well this is it you know again vote that's
like looking at the different way again be active or an activist that's great
but you know here's the problem with respect to cars
um first aside from being a quarter of your carbon footprint they're a huge financial burden
so actually aaa is the the group that charts this
and they know it every year how much it cost to own a car
and it's about 9 000 and what is this so it's the cost of buying
it yeah but then maintaining it putting gasoline in it having insurance
you know having it registered with the state and paying for tags
paying for tires all that if you add it all up it's about nine thousand dollars a year
if you have like an suv it's a little more it's like eleven thousand a year
but stick with nine thousand and um that's why
you know if you divide that by 12 you you get 750
a month which you're actually paying what you're actually paying
and nine thousand dollars a year for the average american
is about one-fifth of their annual income
even a little more and you can say well okay but if i make more money than that
um it's going to be a smaller percentage

well yeah in theory that would be right
but you know the automobile industry
which has a huge investment in making
sure that you keep buying cars
um has you covered there because as you
become wealthier
you won't want a small you know economy
car anymore you'll want a more expensive
one
and you know even if you're making a lot
of money you know the industry is going
to try to sell you you know
some big mercedes or something which is
going to cost a lot more than nine
thousand dollars a year to operate
so surprisingly even though when people
make more
than the average amount they spend more
on cars
and of course if you go online you'll
see all sorts of you know influencers
who
show you their 12-car garage and all
their bentleys and everything so
even people who are making you know have
millions of dollars
spend fortunes on their cars and of
course that's just the way the
automobile industry likes it
the other thing the third thing i note
here you know not only are they horrible
for the planet not only horrible for
your for your finances but of course
they're death traps
um who the world health organization has
called automobile ownership a death trap
i mean an epidemic so you know compare
it to something like
um malaria which is a huge problem
worldwide
absolutely is but cars are much worse
more people die from it in fact 50
million

people are injured or killed every year
in automobiles
so they're kind of a lose-lose-lose
proposition
part of the problem here and to
understand about cars
which is often ignored is that before
you even
drive them they're a problem that's
because
you might imagine you know cars are big
they can weigh like 5 000 pounds or even
more
enormous amount of resources are in them
right just
like steel or aluminum you have to you
know you have to extract all those
um minerals you have to refine it you
have to create steel
you have to shape it and all all that
emits a lot of co2
17 metric tons are released in the
atmosphere during the manufacture of a
typical car
and if you have like a luxury suv
and the study that i'm referencing here
was actually a land rover
in that case it's not 35 but double not
17 but double
35 metric tons are released now to make
it so
even before you take your first ride and
you buy a new car you've already blown
your entire budget for the next eight to
17 years
what i mean by that is if we are going
to meet
the goals of the paris accord everyone
on the planet pretty much
has to emit about two metric tons of co2
or equivalent gases and no more per year
so if you actually sort of meet in the
middle here

and it's not actually even on the low conservative side between 8 and 17.
so what you do then of course is divide 17 by 2
and then suddenly when you buy an average
car even before you take that first ride you've already expended your budget for eight and a half years
if it's you know a luxury vehicle or suv you can reduce you can actually have blown it for
17 years 17 and a half years
let's say you meet in the middle at 11
so you're not buying the least expensive car and we're serving the most expensive well the problem here is that that's how long the average american keeps the car
that's actually up from a few years ago it used to be people just kept their cars for like eight years
um and this you may sell your cars you may be kind of person who likes new cars and keeps selling them but that's kind of like how long they'll be on the road because someone else will buy them but 11 years is the average so if you think about it
if the average car is producing 22 metric tons of co2 in its creation
that means that if you just have a car and you never drive it you never take it out of the driveway you just buy a new one every 11 years
you have fully blown your carbon you know your climate budget
for your lifetime so you see the problem with cars and you can say well
yes but people over the developing world aren't buying cars so i'm okay if i have one
well that's not a very fair attitude to

uh to have and um i suggest you go back and and
you know look at the end of the last lecture when we talked about climate justice
but you know beyond that the fact is the developing world
is getting cars there are a billion cars on the planet right now by
2035 that's going to go to 2 billion cars
so you know it's the same story what we had the rest of the world is now getting
and it all has a significant climate footprint so
yeah you really need to think about cars
but i note here on an optimistic note it is
and there are technologies uh available to us that allow
um us to transport a person 350 500 even 750 miles on a single
gallon of gasoline or its equivalent put that in perspective
um four gallons of gasoline and so where i am in santa barbara here four gallons of gasoline
even in my my hybrid um you know would get me down like to ventura or oxnard and back a round
trip maybe a little further with that at the hybrid
but there is a transportation technology that would transport you
from here to the east coast
so what are these wonder technologies i note here there are
you know been around 100 years we're talking about buses subways and trains
so the average car in the us gets 25 miles per gallon with a single occupant
a bus is 14 times more efficient than that a subway 20 times

and a passenger train
up to 30 times more efficient so you
know i'm doing 30 times 25 and that's
where i'm getting 750.
of course you know the train and buses
have to be you know pretty full to get
optimum
efficiency here but it is remarkable the
difference between
mass transportation and personal vehicle
and
the big problem here is that three out
of four cars on the road 75 percent of
our cars on the road have just one
occupant in them
so you have a massive you know 5 000
pound
vehicle transporting just one human
being
with a minimal amount of stuff you can
you know do the same with like a bicycle
or
my other vehicle we have we're a two
vehicle
uh household here the other vehicle is
an electric bike uh or
our other vehicles electric bike and the
electric bike
has like literally one 100 the resources
in it than a typical car
and back just about 1 100 the resources
of something like a tesla which was an
electric car
so to put that in perspective in terms
of the carbon budget and all you know
you could manufacture
one tesla to carry one person around
where it was the same amount of
emissions you can manufacture 100
electric bikes
to carry 100 people around
there are all sorts of international
movements grassroots efforts to change

the infrastructure of major cities
so i mentioned it's happening in santa barbara this is of course
a dedicated bicycle lane what's so great about these
is um you don't have to
to produce a whole lot of new resources and and consequential
and in the process of more greenhouse gases
you know this was actually just a roadway and the roadway here
you know has been converted instead of running cars this is now
devoted to bicycles and this is a very nice bicycle trail because see they've created a
border there which is also green so it's you know
you know soaking up co2 as we know plants do um
and it makes it so much safer and feels more comfortable
there are more ambitious things this is not an artist's conception this is a
real bicycle turnaround so
if you've ridden your bike in ucsb you know we have those turnarounds for
bikes well this is a massive one um
creating you know linking together a whole bunch of bike trails i mean
these things do you know the sort of infrastructure does have a climate footprint
but on the other hand you know it's a lot less than
than we would have building something to run you know automobiles and all
and the other thing is you know cars aren't really even necessary when you
come right down to it so a third of the people in manhattan
which again is a very dense community

but they they walk to work
and in a community like that i know here
new yorkers are 11 times more likely to
take mass transit than
to work so people have have looked at
cities and people like edward glaser who
writes a book called the triumph of the
city
david owen who wrote a book called green
metropolis
and they've looked at
and and oh glaser especially so owen is
a journalist and glazer is a harvard
professor
and glaser has looked very carefully at
the carbon footprint of cities
and realized that they are much much
more efficient than
living in suburbs and rural locales part
of the reason is indeed transportation
so you know if a quarter of your carbon
footprint is coming from
having a car and you live in manhattan
and you don't have a car and you walk to
work in most places
well that's cut your carbon footprint
off and
down significantly secondly if instead
of living in a big you know suburban
house which is
you know larger and rambling and all you
live in a small
pretty compact apartment you know in
manhattan suddenly then
we'll see if you've lobbed off another
big chunk of your carbon footprint
and then you know beyond that
if you go ahead and
live in a small apartment then you're
not going to have a whole lot of
stuff you know if you live in a suburban
house you may have accrued lots of stuff
your you know your garage may just be

taken up with stuff
so all that can help reduce your carbon footprint
um but it is a note here quite possible for human beings to live rich and diverse lives
free of the automobile we're told that we need a car to
be who we are right i mean there's that saying you are what you drive that your identity is somehow
tied into a car and you signal to the world you know how successful you are or whatever by having a car
well you know you don't have to buy into that i don't think the buddha would have bought into that
the rose certainly wouldn't um curious regarding this about cities being more efficient and all
where would you like to live when you graduate from ucsb
unless you intend to stay here and stay in goleta which is fine
people have done it um hip city like san francisco brooklyn or vancouver that's kind of an ideal for a lot of
people but increasingly very expensive so b might be another idea to move into
um another city maybe not quite as hip as vancouver
but still cities all over the us and the world
are are being rejuvenated now as as most the world's population is moving to them to cities
or do you want to live in a suburbs or a rural locale and it's okay if you're not sure
but one thing to think about when you make that decision you might make it for all different sorts of reasons and

that's fine
but um think about the um you know the
footprint of that
[Music]
yeah so air transportation
i want to just throw this on here if you
fly three or more times per year
it can account for a third or more of
your carbon footprint
and and that's something that you know
is going to vary from person to person
you may you know fly great distances we
have students at ucsb who
you know come here from different parts
of the world
you may have a big carbon footprint
because of that um
maybe that's just now while you're here
but there are other people who you know
take
multiple you know long vacation i mean
far away vacations every year
and really rack up the the air miles um
put this in perspective if you fly coach
from you know la to paris and back
you know you will have entirely blown
your entire carbon
budget and that's the one that cop21
said about
the cop21 implied based on what they
asked for of about
two metric tons a year well if you fly
from la
to paris and back you've blown your
carbon budget
for a year and a half if you fly from
lax to new york
and back you've blown your carbon budget
for one year
that's how bad carbon the problem is and
in fact i note here
there's no faster way to contribute to
the climate crisis than by flying i mean

i guess you could
you could buy you know a drum of oil and
put it in your backyard and set it on
fire maybe that would be
um could contribute faster but if you
think about it like if you fly
to him from lax to new york and back you
know if you literally
you know the plane turned right around
and came back that whole experience
would be like 12 hours
of your life and during that 12 hours
you would have
expended your whole annual carbon budget
right there
and in terms of climate justice you know
it is a very unfair practice right 19
out of 20 people on the planet will
never step foot in an airplane
um you know even among americans half do
not um
fly you know annually so
yeah flying is one of those practices we
don't necessarily think a great deal
about
but it's one of the reasons that
americans have put so much
of the atmospheric greenhouse gases in
the atmosphere
and you know we have you know we're a
small country comparatively
population 330 million people
in a global population of seven point
three
quarters so if you do the math we're
only four percent of the world's
population right everything else being
equal we should have put four percent of
greenhouse gases there
and yet we little america or our little
population
we put you know a quarter of those
emissions there um

one of the reasons is is air transportation
which is one of those things that a lot of the world just doesn't have
so let's look at housing too pop back on here
back to our emissions from the union of concerned scientists here
so again if you add home heating and cooling and other home energy use
add these two together you get 32 which is even more than transportation
so how can we address this issue personally
well you know again we have we have thoreau to
to start with i guess you know thoreau uh
following ben johnson and others um euron horace
asked this basic question and that is you know
what is actually required of a person for a dwelling you know and he again he comes to basically
a one-person tent size but he backs off on that and comes up with something that's about the size of a a garden shed today maybe a little bigger than the average one which is 150
square feet and that may sound totally unrealistic to you and you might have thought well that's just crazy
ah but let's talk about some things today
like the um tiny house movement and micro apartments but
first let's look at the uh the average americans carbon footprint
um yep just to put this in perspective roughly a quarter of the average american's carbon footprint comes from having a car

roughly a third comes from your house
it's not quite as simple with a car you
can say i'll get rid of a car and i woke
up you know use alternate
transportation or walk and bike
everywhere and if you live in a place
where that's
possible to walk and bike everywhere
easily like in the city
well you're all set but you can't get
rid of transportation
or housing rather so you have to come up
with a different approach to housing
so the average house in the u.s
used to be a lot smaller than it is
today
1950 the average house was under 1 000
square feet
2015 it moved up to over
2500 square feet for the first time
so the fact is it's two and a half times
larger the average home than it was and
you can say well maybe families have
gotten larger
but as i note here it's just the
opposite in 1950 the average family size
was 3.54 people
in 2015 it dropped significantly by a
whole person to
2.54 so even though houses are two and a
half times
larger there are fewer people on average
living in each of those
houses so
there's no way to account for that in
terms of like population or you know
that maybe you know people are having an
extra child and needed a bigger house
this is all because people want at
larger houses associated larger houses
with
with wealth or prestige or luxury or
having

added space for whatever reason but again you know
um that's not something that was required right people
you know lived perfectly fine lives in houses that are
1 000 square feet and i'm saying this while looking over at my house which is just about 1 000 square feet which was built
earlier than this in 1928 um
which is you know two bedroom and one bath and that was the typical house for a family you know so
you know a typical family might have been you know
two children they shared a room that's how it worked
um was it ideal i don't know but it
it did work and environmentally you can see why
this huge growth is a problem and if you think that you know
a thousand square feet sounds small i note here that a typical japanese
home for a family of four so the same basic size as the american family was back in 1950
this is traditional japanese home was about
400 square feet so it's it's
compared to that the average american home in 1950 was two and a half
times larger than 400 feet and then you know two and a half times again to where we are today
and you know you can see the part that was handled architecturally
so if you you're familiar of course with japanese homes with those you know soji screens the uh
you know the paper screens that slide around well what that's for

is that you have a space during the day
it's a common living space like a living
room kitchen type area
you know all combined together a big
open space but then at night
you slide these walls and you create
additional rooms so
you don't have two bedrooms during the
day but at night you have
two bedrooms or more bedrooms by putting
walls up now they're thin walls but you
know
you have to deal with that but it does
kind of raise the question of why we
have these different rooms that we never
use and
there have been studies and i think one
of them was coming out of ucla or
usc i forget but actually looked at how
people moved around their homes and as
you might imagine
an enormous amount of time is spent like
in a kitchen and related area
and then of course time spent in the
bedrooms at night but a lot of other
spots
uh in houses because we have such large
houses just never get visited very much
and you know it does raise the question
why couldn't you kind of consolidate
everything into something smaller
and again it's not like that's just a
modern idea with like tiny houses
other cultures have done it for a long
time
um but there's an even bigger problem
that you know
um one in five homes in the us is is is
much larger than that average of 2500
feet
um it's in fact three to thirty nine
hundred feet three to
four thousand square feet and one in ten

is over four thousand square feet and
that's a real cultural significant
movement
because it's the rise of the so-called
mcmansion
and of course ben johnson was was
talking about
basically mcmansions 400 years ago now
they're a thing
and you've seen them with you know
multiple car garages and they're often a
lot fancier than this but there are
they're they're big massive you know
like like a barn type house
that is the thing so what's disturbing
about that it's not just that one in 10
americans choose to live in a place like
that
but that is now the american ideal with
respect to
you know housing the american ideal with
respect to cars might be i don't know
you have a big audi suv or something or
a bunch of
suvs i don't know what but this is the
american goal here
so as long as that's the goal and people
are
striving for it you know you could see
where regular houses kept growing in
size
and you know it's disturbing because you
know wouldn't it be so much better
if the goal were a traditional japanese
home so instead of going for five
thousand you know
hoping for four thousand feet or more we
were trying to get 400 feet or
or less and that sounds impractical but
we're going to talk about that
in a moment here so
here's the problem there so remember all
the

uh co2 that's emitted creating a car so
you know
where you know even if you own a series
of cars and never drive them you still
have blown your carbon budget
well 80 metric tons of co2 is you know
admitted just making a two-bedroom home
so even that small land like from the
1950s
80 metric tons and again we're talking
per person
two metric tons a year in allocation so
it's like 40 years of your carbon budget
now keep in mind that houses last longer
than cars i knew that the average
car only lasts 11 years houses last a
lot longer and more than one person
lives in the house generally
but still it's a significant amount the
problem though with
car with um this example
of houses and this is you know
the issue that we have with cars too
it's not just the manufacturer of them
and all
it's the fact that you have to to fuel
them in the form of heating and cooling
and remember when we had that chart from
the union of concerned scientists you
you had all that and that's
that's significant so to heat a home and
to air condition the home and
most of the u.s more energy is expended
air conditioning than heating now
and we've moved to a number of regions
in a big way in the second half of the
20th century
that require a lot of air conditioning
and by that i mean
you know we have huge growth of suburban
um
housing developments in places like
florida and arizona

and that requires an enormous amount of energy to cool those places
yep so what's to be done well you know there are a number of options and i'll go over three of them here
tiny houses micro apartments and eco villages or co-housing
so tiny houses average american home is 2500 square feet
tiny houses by contrast can literally be one
tenth that size at around 250 square feet
so this is smaller even than the traditional japanese home
and it's actually closing in on thoreau's size right the rose cabin is 150 square feet
but keep in mind that you know many tiny homes have have more than one people have couples living in them 250 square feet
so it is literally possible
all other things being equal to reduce your
your your carbon footprint your climate footprint by a factor of 10.
we saw you can do that with a with transportation i noticed that you know you can reduce your um just the expenditure
of co2 to make the the transportation you can reduce it from a car to
an e-bike a pedelec bike by a factor of a hundred and of course transfer
walking is even more so in transportation you can easily reduce your carbon footprint by a factor of ten
believe it or not even with the house you can reduce it by a factor of 10 by something like a tiny house
micro apartments are another example

um you know most people now live in cities
in 2011 was a milestone
that over half the world's population was in cities and there's a great movement a migration of people toward cities for all sorts of different reasons
but by 2050 70
maybe even three quarters of people on the planet will live in
cities and houses are less an issue or less i guess prevalent there then depending on the type of city and and how spread out it is but we're also talking about apartments too
so in response to this and for environmental reasons in 2012
for example new york city had its adapt nyc
pilot housing program and what this was was to it was like a competition set up for architects and developers
to be able to build an apartment building that wasn't based on large apartments but considerably smaller ones
and the winning design you know the units ranged from 250 to 370 square feet
i just threw this one out as an example this is happening
all over the united states and world and you know zoning is being rewritten because before
it was literally not you know permissible to be and you have a house that small
an apartment that small but now um in places like san francisco
portland boston you can imagine that the cities where it would be happening
um kind of forward-thinking cities it's now possible to have apartments at like 220 square feet

and if you go online you can see just
hit micro apartments into youtube and
you'll
you'll find all sorts of interesting
videos of how people live
and it can be um it can be can be very
desirable looking
actually and again you're talking here
you know carbon footprint everything
else being equal a quarter of the
average american home
another option that we don't think a lot
about so you you know i know on
on their tv shows about tiny houses and
i know
you may have seen like micro apartments
and all but um
less common in the us or eco villages or
co
housing in fact in the movie happy
at one point if you'll remember there
was um
visiting with um a single mom and three
kids and she was living in a co-housing
facility
um and it is and this is in europe and
it is more common in europe that way
and in a way it's because we we don't
have the same
sort of concept of who we are i think
um as in the us as elsewhere what i mean
by that is you know
there's a notion of the the rugged
individual uh
in among americans and what i mean by
that is you know
we are individual right we live by
ourselves and we like being alone
and we like having cars where we can be
alone and the notion of having sort of a
communal life
is a little you know it's just not what
like americans think of you know we

don't like being in a bus with people we
want to be in a car by ourselves
um and you know if you don't like that
then you're not necessarily going
i like the idea of living communally but
that's
what an eco villager co-housing is and
if you think about it
it makes a lot of sense and what i mean
by that is
you know the fact that um
we you know like we'll say in like uh
micro apartments you know every one of
those little apartments has to have its
own kitchen
you know does that make any sense you
know when you could have a community
where
say you know 10 or 12 units where you
have maybe just a tiny kitchen yourself
or like incidentals but you share one
kitchen
you know wouldn't that make more sense
why do you have to have
so many things that you that you have
together um
i mean individually when a community
could share
those and if you think about it then you
know the actual living area you have
could be a lot smaller
and there would be advantages here right
i mean you're part of a community if you
remember in the movie happy
you saw how you know a teenage daughter
had
all those friends sort of like you have
this built-in community
and you know there are certain
advantages i mean there are considerable
advantages you know if you have
you know um because it sort of
replicates what happened with the

traditional
family so you have some people living in
community or older
they can sort of you know be as
babysitters and look after people
and and and help in different ways
there's an entirely different way of
thinking about
you know living and how we live than
than we often do in the united states
they're there it is here in the united
states and
you know the movement really has been
growing since the 1970s
and i think i suspect it'll become even
even more common in time and it's
probably not for everyone and if you're
looking at thinking about this you might
think well i'd rather
have my own little micro apartment and
that's okay
um but it is interesting to do
what thoreau did in a modern sense and
that is
yeah let me just stop for a moment and
take stock
of my options when it comes to housing
that's what thoreau did
what is the minimum that i need
is it a tiny house is it a micro
apartment and how would i like to live
you know what would be the most
rewarding for me and
i think that's a great thing to do and
you know you just don't have to like
you know buy into to the current
american
dream of having a mcmansion if you can
afford it
or somewhere short of that if you can
you can you can you know think about how
you want to live
a little so um yeah i'll let you

do just that if you'd cons if you'd
actually consider that
and again um going to throw in the
buddha you know
you can think about this just for
environmental uh from environmental
perspective and that's great but
you know maybe life could be better this
way
and the same thing with car by the way
you know you have the potential
for um living
in a way that doesn't cost nearly as
much too and remember
thoreau's thing right you know everybody
else worked six days a week and took one
off and he wanted to take
six off and work one day a week well
in having you know reduced demands on
your
your income from home you can you can
approach something like that
um stuff
so note here 26 so
note these right if we if we think of
this as a unit which we just did for
housing and we talked about
transportation
stuff is another huge chunk and again
this
is coming from the union of concerned
scientists the
same chart we just looked at so
let me go and give you a quote and let
me get off the screen for this
um so a guy named
victor labelle wrote an article and he's
a retail analyst so he's not a
scholar but he was actually someone you
know working with the um
the advertising industry and he
published an article in the journal of
retailing in 1955.

this is a pretty famous article at this
point it's been um
if you've seen the story of stuff you've
seen it here
but let me just read what he says here
our enormously productive economy
demands that we make
consumption our way of life that we
convert the buying and use of goods
into rituals do we seek out spiritual
satisfaction
or ego satisfactions in consumption
the measure of social status of social
acceptance of
prestige is now to be found in our
consumptive patterns
the very meaning and significance of our
lives is expressed
in consumptive terms the greater the
pressure upon the individual to conform
to safe and accepted social standards
the more does he tend to express his
aspirations
and his individuality in terms of what
he wears
drives eats his home his car his pattern
of food consumption
his pattern of food serving his hobbies
these commodities and services must be
offered to the consumer with a special
urgency we require not only
for stress consumption but expensive
consumption as well
we need things consumed burned up we're
not replaced and discarded in either
an ever increasing pace we need to have
people
eat drink dress ride live was ever more
complicated and therefore
consistently more expensive consumption
yeah well wow um
this is modern consumer society being
laid out

in 1955 65 years ago
65 yeah 65 years ago and
um it lays out very
clearly here the dark side of consumer
society many people will call this
capitalist society capitalist and we've
talked about capitalism in a way
and it's emerging in the early modern
period but you know
victor lebeau here really focuses right
in on it as
consumerism consumer society
and you can see and lebeau is speaking
to retailers you know giving them their
marching orders what
they need to do you know this is what
consumers have to be
converted into this consumptive this is
what human beings have to be converted
into these consuming machines
the problem with that well it's not very
pleasant for human beings i think to be
converted into a consumer machine
but also you know if you go to you know
the end here
you know we have to you know you know we
need things consumed
burned up worn out replaced and
discarded at an ever increasing pace
well that has a huge environmental
you know import and climate import as
well
so consumerism is something that you
know we really need to look
straight out of that and it's again you
know in the whole project here what
we're talking about is
it's the rose project you know what what
do you really need to live
and thoreau of course came up with you
know very minimum amount of stuff and
modern minimalists and thoreau is sort
of the great great grandparent of them

you know they will try to figure out
just what you actually
need to live and and have no more and
again you have advantages here because
you're not spending all your money
and the retailers here that's their job
separate you from your money
but you know that means you again have
to to work
less and all and just you know have
fewer things
but um if you look at the rate in which
we now
do consume things so in the same way
that you can look at like how houses
have gotten bigger
and more problem environmentally well
consumption has become a problem so um
there's a an interesting book i came out
a little while ago by elizabeth klein
called overdress
the shockingly high cost of cheap
fashion which delivers in some ways a
similar message to
um that that you get in the the movie
the true cost
but klein notes that the average
american buy 64
items of clothing a year and that's not
including incidentals like socks and
underwear
64 items of clothing a year
for every person for every adult in the
u.s for every child in the u.s
that's an astonishing amount i mean how
many items of clothing
do we actually need and of course it's
always a documentary true cost
fast fashion has made things so
inexpensive
you know people buy lots and they they
never actually even
you know where or significantly wear it

right you should be able to wear a
garment
um you know the way they traditionally
did in japan until it was completely
worn out and then you know even recycle
it
something new but that's not the way we
work now we're all about consuming
consuming consuming and and if you think
about it
you know the the act of going online and
and and shopping and looking and all
that that activity
is in some ways more important than the
the actual item itself
right so now we you know it's less about
having and wearing the clothes and then
aspiring to have them
and and you know shopping for them
this is you know dramatic change from a
generation or two ago and fast fashion
is of course is what's made that
possible and in general consumption is
going up and up and up
you know you look at something like um
a pen you know americans and annually i
could have given any number of examples
here but since i
usually have a pen with me um you know
we go through about 300 pens in a
lifetime
because there are now these disposable
objects right you
generally don't refill your pens
nowadays but you think about the fact
that um
fountain pens my fountain pen it's it
works
really great and it's actually more fun
to write with and i know people
you know look at you kind of funny when
you pull out a fountain pen but if you
think about it

traditionally most people have had a
fountain pen or two
in their lifetime you know you're you
know you graduated from
from high school or college and you were
given a fountain pen it was a big deal
and
you know it's a valued object and you
kept and used every day
and you can use it every day and refill
it every day you have one fountain pen
one little bottle of ink and you're good
for a lifetime
or you could get 300 disposable pens
similarly people
you know used to have just one one razor
they'd use all their lives and now you
go through disposable ones every day
so we've become very much this you know
disposable consumer society
obviously people have commented a lot on
this but
from our point of view from an
environmental point of view from a
climate point of view
this is a huge problem
yeah there is an interesting book called
the waste makers we
read from it in english 23 climate
crisis 101. 101
obsolescence planned obsolescence was
something that was coined 50 years ago
by vance edwards in that book
and he identified three types of planned
obsolescence
what this is instead of making a product
like a fountain pen that would last a
lifetime
that manufacturers made sure that our
the products they sell you
do not last a lifetime that they would
become obsolete
soon enough um yep

this is um the first example would be
obsolescence of function
in which case the object still
functioned that you have
but a newer better one appeared later so
an example would be like a desktop
computer
many desktop computers um still work you
know compared like to a smartphone where
you may break them or smash the screen
or something
computers a lot you know often don't
break but
after five years six years eight years
that product is now obsolete
and in fact at some point you know
whether it's apple or whoever has the
operating system and
and you know developing apps they'll
stop supporting it
what packard drew attention to that's
intentional on the part
of the um the manufacturer could they
make a um
a computer that you could just change
the components yeah that's how they used
to make computers like in the 80s and
90s and all but
i'm actually you know looking here at a
um a one-piece mac an imac
and there's no way to change the
components you can't open it up and
and change it it'll be very difficult to
do so i mean it used to be you could
literally
open it up and pop in new memory if you
need it or pop in more storage or even
pop
out the cpu and pop a new one in
i know you can still like you know
people who do mod modding for like
gamers and all have computers like that
but most of us don't and i think there's

a real desire
for us not to have them by the big
manufacturers because they want their
products to become lead
obsolete so the next one is
obsolescence of quality and that's when
a um the product breaks down or wears
out
because the quality is not there that
was very
in the bose time i'm sorry in vance
packard's time
that was very clear with automobiles
cars were designed to last like a
hundred thousand miles
the very bearings that were used like in
the wheels and all everything would
start breaking down then because they
had no desire for the car to last
longer um that that
became kind of a big scandal because
people were frustrated by it
and in a way they shifted to the next
way of making a product
obsolete which is the obsolescence of
desirability
in that case i'm saying with our car
example you can have a car
that would be perfectly functional and
they say the bearings were made to last
for a quarter million years
you would never hit that or wouldn't hit
it for a long time
but um what was happening in packard's
time
is basically every two and a half years
a new
model car was being introduced and even
though your car would still work
how they got you to buy a new one was to
make the car
more desirable so that like you know
after five or eight years it would be

like you know i'm going to continue
driving that old car around yes it still
drives but
the newer fancier ones is what everyone
has and i want everyone to
think i have the newer fancier one and
that now happens everywhere right so you
may know
apple every year i mean every year
introduces a new iphone
it's not you know the word goes from the
10 to 11 or 12 or 13 whatever they
they have but you know in between years
they have you know
a a a minor step phone so it's the uh
i forget what they even called them now
whether it's the apple 12
e c i don't know but you can see where
the goal is to have people
every year want the new thing and
apple and um you know so cellular
companies have
a new model here which really takes this
to its logical conclusion
you may know this you pay a certain
amount every month and every year you
get a new phone that's how it works
but i mean wait what you should have you
know a phone should a theory be able to
last
many years maybe a decade or so
especially if you could upgrade some
components in it but and and
there have been attempts to design
phones that way they were modular you
could upgrade them
but you know this is it's
taking it to its logical conclusion that
you have to have it every year
and this ties into what we talked about
with clothing
because it is fashion the fashion
industry is what set the standard for

everything else in other words
when cars became you know changed every
few years and the styles different new
colors and all
that was modeled on the fashion industry
the you know
clothing industry that sort of were the
first people to work out the fact that
you know every year you'd want a new
thing even if it still worked out just
fine
even the old one worked just fine so
we've gone through transportation
housing together
stuff and by the way you can see you
know
get rid of a car you can dramatically
reduce this
go to a tiny house micro apartment co
housing dramatically reduce this
like thoreau you know buddha become a
minimalist
hardly have any stuff you know you could
dramatically cut down on stuff you could
see
that if you really worked at it so you
know you could have a house
one tenth the size of a regular house
you could cut your transportation
footprint down
by a factor of ten you could probably
cut your stuff down by a factor
your stuff the footprint carbon
footprint climate footprint from your
stuff
down by a factor of 10 also by you know
instead of buying 64 items of clothing a
year maybe buying
six or you know buying um
from like thrift shops or not sort of
online thrift shop um
places so you could see in each case you
could literally

cut your climate footprint down so um
you know the the title of this
particular lecture
you know the climate crisis what each of
us can do about it well
here you had three out of that we just
had three out of the
four biggest things that you can do to
reduce your climate footprint
and now let's take the last one which
although it's smaller
it's still important and that's food
food waste is a major issue in america
40 percent of food in the us is wasted
and
30 of this is at the retail and consumer
level so
we waste a lot more food as consumers
than the rest of the world so in other
parts of the world in the developing
world
they they don't waste nearly as much
food but a lot of it is wasted because
they don't have necessarily good storage
or transportation and all
here we have all that which is great but
um
consumers just waste a lot of food and
you know i know you saw cowspiracy and
we know the problem with
beef and we'll talk about that but i
start with this because
food waste in the u.s causes a bigger
carbon footprint
climate footprint then then shifting to
a largely plant-based diet
so in other words say you don't want to
shift to a largely plant-based diet at
all
okay well you could do a big part to
help the planet
by dramatically cutting down on the food
that you're wasting which a lot of

americans do so
what i mean by that is buy food that
gets wasted in your home
go out and buy you know meow and half of
it gets uneaten and all
you know to if you address that it could
be as big a difference a slightly bigger
difference than if you go to a florida
plant-based diet
although if you really want to drive
this into the ground and approach
like you know one tenth of your climate
footprint the two of these together are
the way to go about it
food waste and largely plant-based diet
so conspiracy um i noted before gets the
the numbers
wrong in that you know
half of our global climate
carbon footprint does not climate
footprint does not come from
food waste as kip anderson says in cal
spurs
more like 15 or so it is still very very
significant
and here's a breakdown and i hope you
can you can see it on your device
of the difference between
different foods and actually it's the
case that
in um some countries like denmark
they're they're actually proposing now
that you know when you buy um food you
know own it now
is the nutritional breakdown like how
many calories how much protein or
whatever
well they also want food to carry a
climate
chart be the same basic thing except it
would say you know
what are the relative emissions for it
and you can see

where these emissions become really large here
so look for example at beef
so you know the amount of protein in a kilogram of beef
so this is the carbon footprint of that
so the co2
to produce it 27. if you look at it
with lamb a lot of people don't realize
lamb has an even bigger problem
at 39 and you know most of this is coming from
production so really high beef at 27.
let's go down here and look at lentils also
a great source of protein lentils the carbon footprint
is 0.9 compared to 27 so everything else being equal
the climate footprint of a pound of beef is
30 times bigger than a pound of lentils
another way of putting it you could eat
30 pounds of lentils for what it would
or you could have you could feed 30 people
lentils for the same amount of you know
co2 or equivalent emissions
as 30 people eating beef some of these things i think you'll find
reviewing so many things here and we talk about largely plant-based
here we are you can see they're all so low so this would be like tomatoes here
milk is a surprising one right so even
if you don't want to go fully you know
vegan and go vegetarian this is two percent
milk here and that's full fat milk actually slightly
less than you would get from from beans or tofu
they could all be part of it and of

course like broccoli yogurt
even nuts although nuts are kind are a problem in terms of like water use and almonds are a problem tree nuts can be can be environmental issue for sure but like peanuts and all which are actually legume like a bean
they're terrific which is why peanut butter is so low here so if you're deciding whether to have a peanut butter sandwich
or whether they have a hamburger note that literally the hamburger
has you know ten times the climate footprint
peanut butter rice is often also low potatoes
even eggs are relatively low and here chicken
at 6.9 compared to 27
which is about a quarter of it so even if you're going to be eating meat
the kind of meat you eat matters a lot
so obviously like
lamb is the worst and beef is the one that people eat a lot that's a big problem
but you know if you just were to get you know a turkey burger
which is here you know turkey burger has like a third of the climate footprint of hamburger not quite but um you could see why
these choices have enormous import when it comes to the climate crisis
and again the goal is to reduce the average americans consumption from like 16 to 20 metric tons a year
down to you know um two metric tons
well we've seen how you can do it with transportation we've seen how you can do it

with housing we've seen how you can do
it with stuff here's how you do it and
this pretty much lays it out with
food if you eat a largely plant-based
diet and again that doesn't mean you
have to be fully vegan
i should confess i was vegan for five
years up until recently
but um i think of myself more as a
climateer and i'll talk about that in a
moment
but you can you can relax on that right
i mean milk if you're
if you're eating again i understand if
you're a vegan what i'm about to say
you're gonna find a little jarring
because
you know obviously um you know we've
seen like with varroa and all factory
farms can be a bad
thing so you might be you know against
keeping cows for milk but
if you're if you're okay with that and
you're just thinking of in terms of
climate
sure milk is fine milk is fine and and
you know even you know occasionally
having meat if if you know from a
climate point of view now
you know if you have something like
chickens a small portion of your diet
that could work too you could literally
be where we need to be
in that sort of one-tenth bracket
there there is a new approach to eating
it's not vegan or vegetarian
the best word for it is clamitarian but
but unfortunately that word hasn't
really caught on it was coined a few
years ago
more commonly is known as a flexitarian
but the idea here is to make food
choices based on the climate impact

rather than other issues
so they can often coincide with issues
such as animal rights
but a climatarian is going to be
thinking
making that choice if you're a pure
climatarian based on
climate so you might choose milk because
it has such a low climate footprint
and if we if we ever did get those
labels on food that's that would be your
guide right
so it's not like the conditions under
which the animal was raised and again if
you're
a vegan or a vegetarian that might be
important
should be important but you would be
looking at exactly you know what sort of
climate impact it has and you could see
that you know with such a vast
difference if you were to eliminate
beef and you know have a lot of
alternate
things like you know nuts and legumes
and milk and
tofu and things like that um and you
know maybe occasionally
you feel like meat you have some chicken
or something and if you thought about it
carefully
you could literally reduce the the
climate footprint
from your food by a factor of 10 also
the problem with animal products is that
you know
a third of all fossil fuels consumed in
the us goes to animal production
that's one you may not have thought of
right so if you think of where all the
fossil fuel goes maybe the first thought
is well
gasoline cars that's where it is well

don't get me wrong a lot goes there
but this is sort of a hidden thing
because you know you have to transport
all that you know food around transport
animals and you have
to raise all the food so you need
tractors to do it you need to use fossil
fuels
to create you know petrol petroleum
petrochemical fertilizers that sort of
thing
so surprisingly it takes a third of
the gasoline of the fossil fuels in the
u.s so think about the fact that if we
were able to dramatically cut down
as a country the amount of wheat the
meat that we ate
you know right there that would be a big
chunk of our
country's climate footprint in terms of
emissions you know you could like drive
20 miles or eat a hamburger so
cars are not good they really aren't and
it's kind of a bad
milestone but or a touchstone to compare
to
but even as bad as cars are eating a
hamburger
is significant um the the other issue is
and it's like that you may not think
about the fossil fuels
needed to make a burger but um
the other thing and i thought kels
conspiracy did a good job of taking this
up
is that we need an enormous amount of
water to raise
livestock so you know um
the average diet for you know a meteor
in the u.s
requires 4 000 gallons of water per day
4 000 gallons of water are used to
produce the food that you eat

every day and even though you know you may say
use you know oh by the way and then compare that
and this is the startling one with water the average vegans diet
300 gallons of water per day you know so that's not
you know one-tenth is considerably less than one tenth
in water and and that matters right because this is another
environmental problem and we're focusing on the climate crisis here and all but
we have other environmental problems we can't forget about
and the fact is that we're using up the world's water and and
it doesn't always cycle back again so if we could dramatically reduce that by more than a factor of 10
and you can do that by the way you eat that's that's terrific
and you might say well you know i would rather save water other ways like using a low flow
you know shower head that's great take shorter showers get a low shelf
low flow shower head but you need to take the relative
you know impact into um into consideration because
doing that for an entire year will save 5 500 gallons of water
that's great but the average american is eating you know is using 4
000 gallons of water almost that much so actually if you have an atkins or paleo diet
your more water is being used in one day to supply your food than you would save for the entire year going to a low flow showerhead

which you should do yeah um
but there are all sorts of other reasons
with with animals too
um 15 of global greenhouse gas emissions
that's a pretty accurate number and i
know again kip anderson had a higher
number but this is accurate
but um you know we talked about when we
i talked about the sixth extinction
and in the last lecture and you know all
these species going extinct and even
those that aren't
we've taken away the habitat and greatly
reduced their numbers
well eighty percent of the agricultural
land in the us is used to raise animals
for food
and and to grow grain to feed them so
to put that in perspective you know if
we
didn't need to produce so much food and
and why this works by the way is because
you know
to produce that pound of beef it takes
like 15 pounds of soybean so you have to
grow 15 pounds of soy beans feed them to
the animal
to create that pound of beef but of
course the thing is
you could have eaten those 15 pounds of
soy beans either directly or
in tofu or it wouldn't have to be soy
beans it could be like lentils or
you know garbanzo beans or something
else it doesn't really matter
so if we all other things being equal
if we eliminated meat it'd mean we'd
free up a huge swath in the united
states
to do something else with we could
continue to grow food for people
that's true but we'd have all this
additional lamb that we could

do things like allow you know
species that were you know are
endangered or nearly endangered
to have you know new living space
um the world's cattle alone consumes
enough
calories to feed 8.7 billion people
and that's more than we actually have
7.7 billion people now
so you know everyone on the planet and
keep in mind a billion people are going
to go to bed hungry tonight across the
planet and
the numbers for that are quite
frightening the amount of people who
actually
you know are food insecure across the
planet across the us
um and that's only getting going to get
a lot worse with the climate crisis by
the way
all predictions are they won't go into
them they're they're
they're disturbing but the fact is you
know
we actually grow enough food to feed
everyone on the planet
just fine and we found a way of
distributing it to all the world's cows
just fine so that's not even taking
any other animal into account like
chicken small which are a huge you know
livestock crop of course um but yeah
we we we grow plenty of food
this is also a climate justice issue
right
2018 the average person in bangladesh
ate 8.8 pounds of meat
the average american 222 pounds
and that's over 20 times more and of
course if you eat like the paleo or
atkins diet you know heavy on
you know protein you may eat a lot more

than that even
and the great injustice here is that
we in the developing world those of us
who like meat
are causing you know climate change to
happen much faster
and yet in places like bangladesh
they're going to suffer
more for it and i noted before that 40
of bangladesh is going to be
you know under um water
because you know just two feet of sea
level rise which again is not a lot and
even conservatively is going to happen
in a few decades really so if you think
about it food systems
are you know if if you
if you approach it from a variety of
different spec perspectives it can be
kind of a win-win-win
right so from an environmental point of
view yeah
this is you know huge portion i mean not
as big as
you're driving your car and all but
still a huge portion
of what's happening with the planet as
far as you know the climate crisis
it's also the case you know if you're
vegan and i don't have to tell you
already and you know this is an animal
rights issue
and you know we're talking about this
global herd of 70 billion animals
kept for us you know it's not hard to
see why this is a big animal rights
issue and then
you know it's a social justice issue so
if you don't care about animals if you
don't care about the planet but if you
just care about other people
well what an injustice it is here and
you know this is an issue that we could

work on solving if we wanted to and i think that
that's it's a good thing to think about here as we're you know
coming to the close of the lecture and the close of the course
that many of these issues can have you know
different aspect the different aspects of these issues and if you approach them the right way
you know it's not just that we're solving the climate crisis but we're solving a lot of problems like animal rights social justice and all
and even if we don't care any of that about any of that go back to the you know
anthropocentric perspective or just the selfish perspective
you know eating beef is going to to take a year off of your life
probably um and it's not just me saying that if you look at someone like um water wooled who's at harvard and you know is
the public policy school there um the studies
that have been done suggested yeah you're more off of your life because of eating beef
so it's not just you know so it's a win-win-win-win
situation anyhow okay
that finishes up for this
and let's just um pull it all together
to conclude the lecture and conclude the course
be the change that you want to see in the world
i attribute it to mahatma gandhi but he didn't actually say it as far as
i think most people can figure but it's

nonetheless
um i think something that gandhi would
have said an important idea
and simply that you know if you if you
want to change the world
you need to start by changing yourself
and i think thoreau realized that and
certainly the buddha realized that as
well that
that's how you you know you have to
start and you can preach to other people
you can come up with grand schemes and
all you know
these are good things in different ways
you know you know preaching can be kind
of a problem if you overdo it
but on the other hand there's there's a
simpler way and that is you know
you can start today you can start in
small ways skip a burger today
you can be the change that you want to
see in the world and that
then becomes a way of teaching by
example
so you know how can you fight the
climate crisis
well we just went through a number of
them here
um one you know vote um
voting is huge again it takes an hour a
year to do
and and voting not just you know
national elections or just presidential
election
but even little local elections can have
profound you know
impact because you can get things like
you know bicycle paths put in which can
directly address the climate crisis
and become active you know perhaps even
become
an activist or there are all sorts of
organizations at ucsb where you can

become active
and you can actually intervene and do
things and of course activism
is effective if you don't believe me
look at greta thunderbird
um so you know let's go through the
things the kind of things that tarot
wanted to do let's think about you know
how we get around what we eat where we
live that kind of thing
well first off you know cars and planes
are a problem
planes are a huge problem um every time
you get on a plane it's it's it's it
hurts the planet in a big way
for an individual action um so you know
i'm not saying
with all this i'm not saying you have to
completely say i'm never going to eat
another burger again i'll never get in
another plane again
but you know every time you know every
time you don't get in that plane every
time you don't eat a burger it makes a
difference
and you know there are other things like
um biking
and you know and mass transit and again
you may
want to do this not for just
environmental reasons or social justice
reasons but personal ones so
i read a study once that said that every
hour that you spend on a bike
you increase your lifespan by an hour
and why is that well because you know
it's cardio and it's just you know it's
a form of exercise and
you can actually streamline your
exercise because you could you know
bike to work and then do your daily
exercise by way of that
because you know depending on your

situation it may not
even take that much longer so i have an
e-bike
and i live 10 miles from the ucsb campus
so it's a 20 mile round trip
it doesn't really take me a whole lot
longer than a car even though i'm right
near the freeway
entrance and why would that be well you
know by the time i actually get to the
ucsb campus in my car i have to drive
around looking for a parking spot
parked in the you know parking lot is
often five or
eight minutes from where i have to go
all that takes time with my bike i just
zip right to my classroom and
it's faster because i cut that much off
and i should note with an e-bike
california has some of the most liberal
e-bike laws in in on the planet really
so we're allowed to have an e-bike in
fact i have one that goes 28 miles an
hour
that's pretty fast so yes cars go faster
i know but
um if you factor in other things like
parking and all
bikes are pretty fast anyhow um
with respect to living you don't have to
live in a uh
in a cabin the size of a one-person tent
the way thoreau originally
contemplated you can live in something
like
you know small spaces smaller apartments
micro apartments
or shared living which is a fascinating
option that most americans don't think
about because we think about ourselves
as being individual and disconnected
from people
you might be being disconnected from

people i don't know if that's
necessarily a good thing so
shirt housing's something to think about
minimalism is a movement now
it's a popular one i hope it's not too
popular in the sense it'll be a fad that
burns out
but you know thoreau uh buddha
these are individuals who questioned you
know what we get
out of out of all these things that we
own
it's clear what the people you know the
marketers selling them get what the
corporations get you know like
tarot says who's enriched by you know
what what is the business of clothing
industries and throw you know
kind of nailed it it's so that quote the
corporations may be enriched
it's not so that your life is enriched
that's the argument
that you know buy lots of clothes and
you'll have an enriched life
it's not clear that that works at all
and probably doesn't
the corporations become enriched
yeah um being a vegan i know having been
a vegan for five years can be really
tough
but there are other options you know
being uh flexitarian
clamitarian and that just means you know
thinking of ways that you can eat for
the planet maybe that will be cutting
out all beef maybe you'll be cutting out
beef one day a week i don't know
but you know everything that you can do
is something that you have done
and and can make a difference and and
more generally then
with the gandhi quote you know be the
change

in the fact that you know um all the
things are just articulated there or in
general
you know i think that's that's a good
point because environmentalists are
often
criticized for um
doing things like getting on planes and
all and you'll see if you go online
you know videos or pictures of al gore
stepping off of a private jet and
yeah and that really does diminish his
message i mean
it shouldn't i mean the message should
be separated from the messenger
but they're often uh confused and
intentionally so
to um to attack the message by attacking
the messenger
i'm just curious what you think of these
if they sound like doable
lifestyle changes uh i think you know
some of these you know maybe like you're
living in a city in a micro apartment
getting around on an e-bike might sound
really exciting
um maybe maybe it doesn't sound like
much fun at all but but doable
and and and worthwhile and i mean
you know has to be done for the planet
and i think some people
will argue that these things are not um
not doable at all
and i should note and i make much of
this in english 23.
this often can be a generational issue
so i found that when i
talk about things like this too my
students um younger generation
they do tend to more often than not go
toward the top end here to find it
exciting or doable
um whereas people my age you know you

tell them that
you know they should get rid of their
car and live in a little apartment in
the city somewhere and get around on a
bike
and not have beef ever they immediately
think that this is like the worst
possible thing you can ever do
and i think that's because of the kind
of habits that we get used to you get
into a habit of something
and it's hard to break that habit which
is a good reason
to try not to get into those bad habits
and finally going back to the the issue
of politics you know how much do you
think that politics
impacts all this um and i'll give you an
example here and i wanted to end with
this because i
i do want to you know drive home that
point if you do nothing
you know at all then do one thing vote
and i'm not telling you how to vote
right i'm just saying
something we should think about if you
if you care about things if you care
about issues and all you'll
you'll find that politicians are often
weighing in on these issues
and if they're not then you may didn't
make these issues for politicians
um i'm giving an example here of a
politician
in california because you know why you
might think that some of the sort of
radical anti-you know climate um
change you know platforms or from
politicians in other parts of the united
states but here
in orange county california is an
example
and won't go through it and all that

rohrenbacher had to say about the
climate crisis
um do read it you know because he's
really um i'm sorry to get out of there
um he's he's saying things that
many many many politicians are using and
this is kind of
yeah kind of the company line for
climate change denial things here like
saying that this is really not about
climate crisis but an effort to create a
global government
and that the science is you know bogus
and it's just you know
um scientists being um
you know getting money and all that um i
i wanted to to put this give this
example
and how it concluded because um well he
was
um after 15 consecutive terms
in congress he was removed so
that's a pretty encouraging thought and
it just goes to show
that you know all over and you may be
surprised even even in california you
have politicians taking
really strong positions with respect to
the climate crisis
and and taking those positions that
taking positions that will
lead to complete inaction with it or
even blocking action
which happens so yeah it's a it's a very
important point
let me get out of there okay
well if you've been paying attention you
realize
there we are we finished remember way
back here when we started remember when
you first
i first dropped you down the rabbit hole
and you saw this

well you've done it we've done it you've gone to the very
end and yeah it's been kind of a long road i know
but i i hope this was was useful for you
um not just you know as a class but
maybe got you thinking about things i'm thinking about things either in a
personal way thinking about the way our culture works
thinking about that many things that we just you know take for granted and seem obviously
true um can have a deep cultural history
and our relationship to the environment
you know has has been has been changing and shifting and
and coming to be in a certain kind of way for a long time now
so it's a good thing to um to think
about these things and not to just sort of go through life without thinking about them
it's a good thing to think about how we how we inhabit this planet
we individually and and each of us personally
and i hope to see some of you in english 23 also known as climate crisis 101
and because we're going to be taking these issues up don't worry there
there won't be any more reading of classical or medieval
things um and i know you really like t-shirt right so
sorry he should was kind of the worst maybe not the worst but he wasn't he was not so hot
but we won't be reading anything like that we'll be reading more modern texts
we'll be engaging directly with climate change denial we'll be focusing on
these issues in in far greater depth and

and most importantly we'll be focusing
on what each of us can do about it what
we as a culture can do about it
i think in an exciting way we'll be
looking at people who are actually
doing that now we'll be looking at
people who who are
already um living a lifestyle that would
that would completely you know stop the
climate or
they would largely bring the climate
crisis to a halt and mitigate what's
happening
and these are not people you know living
weird lifestyles and other parts of the
world these are people right here in
some cases in california
living typical lives lives that you know
you would probably find you may not even
notice this is a big deal