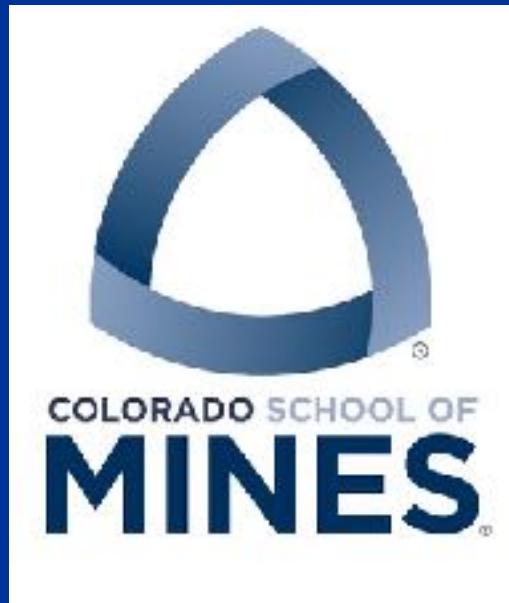


A Christian Approach to Sustainable Engineering



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Baylor University



Colorado School of Mines

- My Mines experience changed my life
 - Two degrees in Metallurgical Engineering (B.S. and M.S.)
- I became a Christian during my junior year when on October 8, 1971 I asked Christ into my life as my savior
 - Through the ministry of Campus Crusade for Christ

Why sustainable engineering?

- Global population will continue to grow
- Global affluence will continue to grow
- Our current impact upon the earth is expected to double by 2030
- The only way to reduce that impact is to fundamentally redesign our global technology
- Sustainable engineering is the solution

What is Sustainable Engineering

- Was added to the codes of conduct relatively recently
 - Example of how what is appropriate engineering practice changes over time.
- From ASME Code of Ethics, Fundamental Canon 8
 - Engineers shall consider environmental impact and sustainable development in the performance of their professional duties.
 - This statement was not in the 1992 version of the code

What is Sustainable Engineering

- From NSPE Code of Ethics, in Section III. 1.2.d
 - Engineers are encouraged to adhere to the principles of sustainable development in order to protect the environment for future generations.
 - This was added to the code in January 2006
 - <https://www.nspe.org/resources/ethics/code-ethics/history-code-ethics-engineers>
 - The first Earth Day was founded by Senator Gaylord Nelson of Wisconsin and was held on April 22, 1970

What is Sustainable Development?

- NSPE defines the term:
 - "Sustainable development" is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.

What is Sustainable Development?

- Sustainable development is defined by the sustainable engineering program at Villanova as:
 - **Enough**
 - **For All**
 - **Forever**

What is driving the sustainable engineering movement?

- Government regulations
- Desire to do good
 - Pressure from consumers
 - Impact of Walmart
 - Pressure from employees (in particular, the millennials)
- Ability to make more money by being more sustainable?
 - Story from Dr. Jordan's experience at Villanova last fall

Sustainable Engineering controversies

- Sustainable engineering is related to issues of climate change and pollution, but is much larger than them
- Global warming is part of climate change, but not all there is to it.

“Opponents” of climate change

- These are my very personal interpretations based on longtime involvement with conservative politics.
 - Delegate at many state conventions
 - Louisiana—1992, 1996, 2000, and 2004
 - Texas—2012
 - Twice a delegate at my party’s national convention (1992 and 2004)

Categories of opponents

- These groups are overlapping, many people are in more than one
 - No climate change is occurring
 - Liberals believe in climate change, so it must not be occurring
 - Climate change may be occurring, but it is a natural process and we cannot do anything about it

Categories of opponents

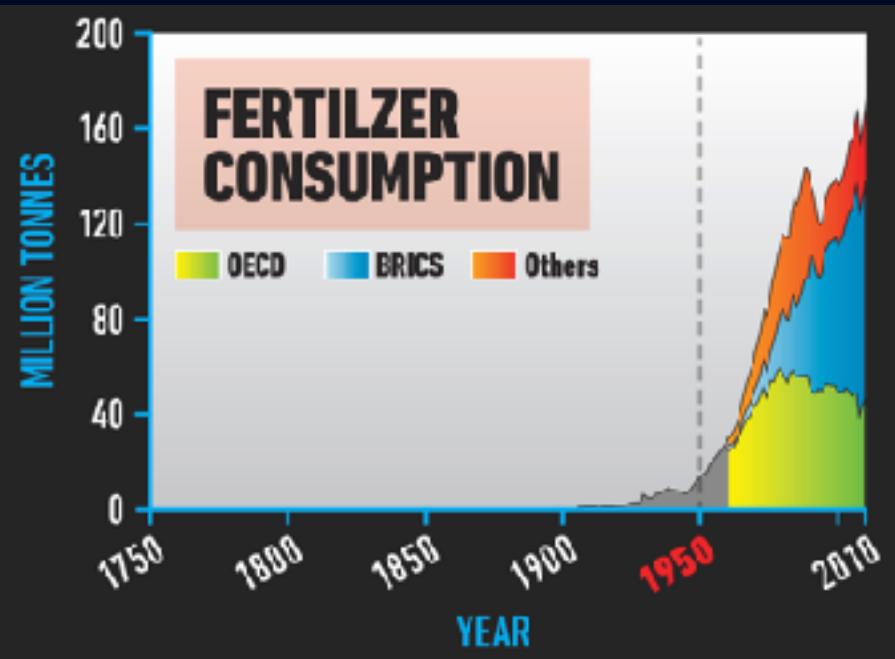
- Climate change may be occurring, but God is in control and we have nothing to fear
- Climate change may be occurring, but do not like the big government solutions that have been proposed
- I personally believe the last category is the most influential.
- If we can show people market based solutions to these problems, much opposition will probably end

How I have changed

- I have been committed to doing sustainable engineering for some time
- At the same time I was also a mild climate change skeptic
- My sabbatical at Villanova University in fall 2016 changed my perspective as I looked at many aspects of sustainable engineering

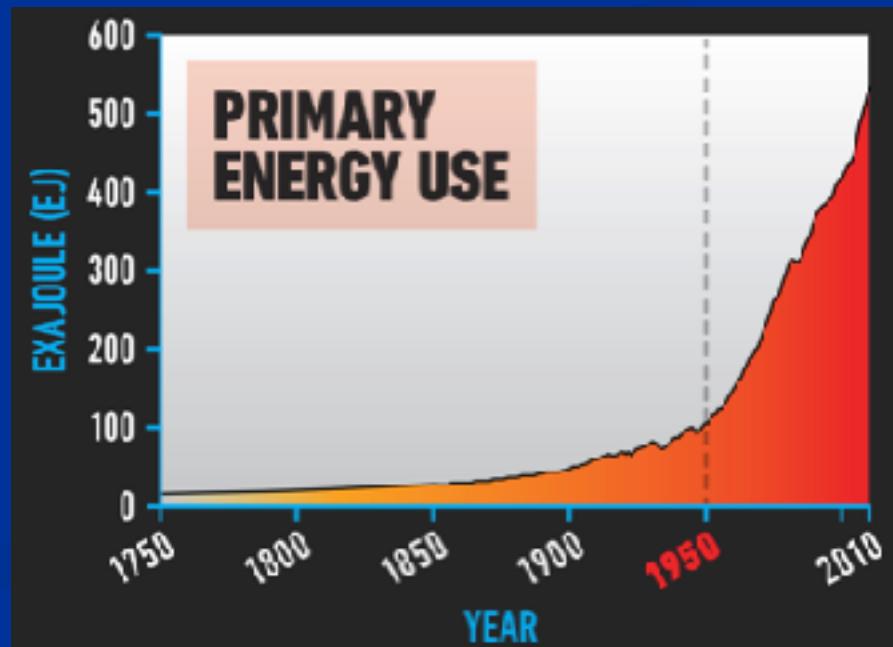
How I have changed

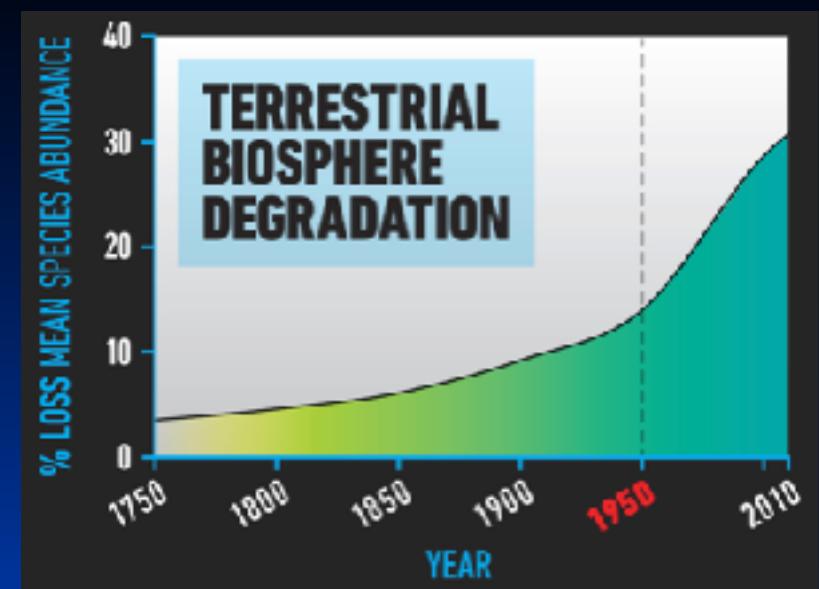
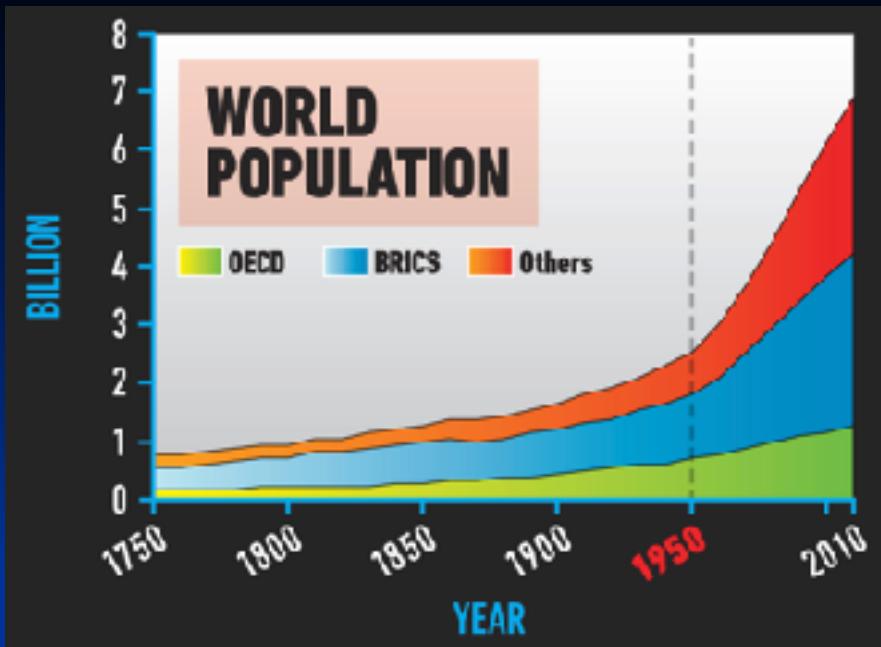
- I still think there are some ambiguities with respect to global warming temperature data.
- However, I believe the evidence for human effects on climate change is overwhelming



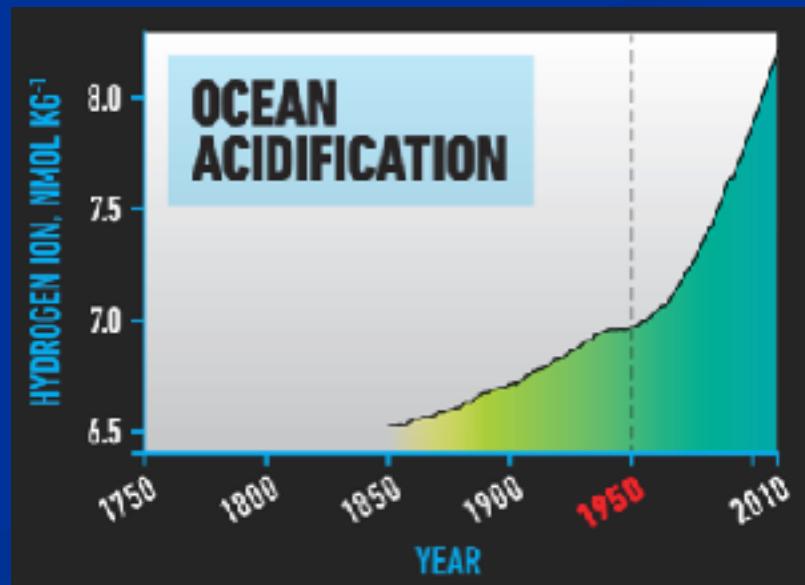
The Great Acceleration

Graphs from <http://www.Anthropocene.info/great-acceleration.php>



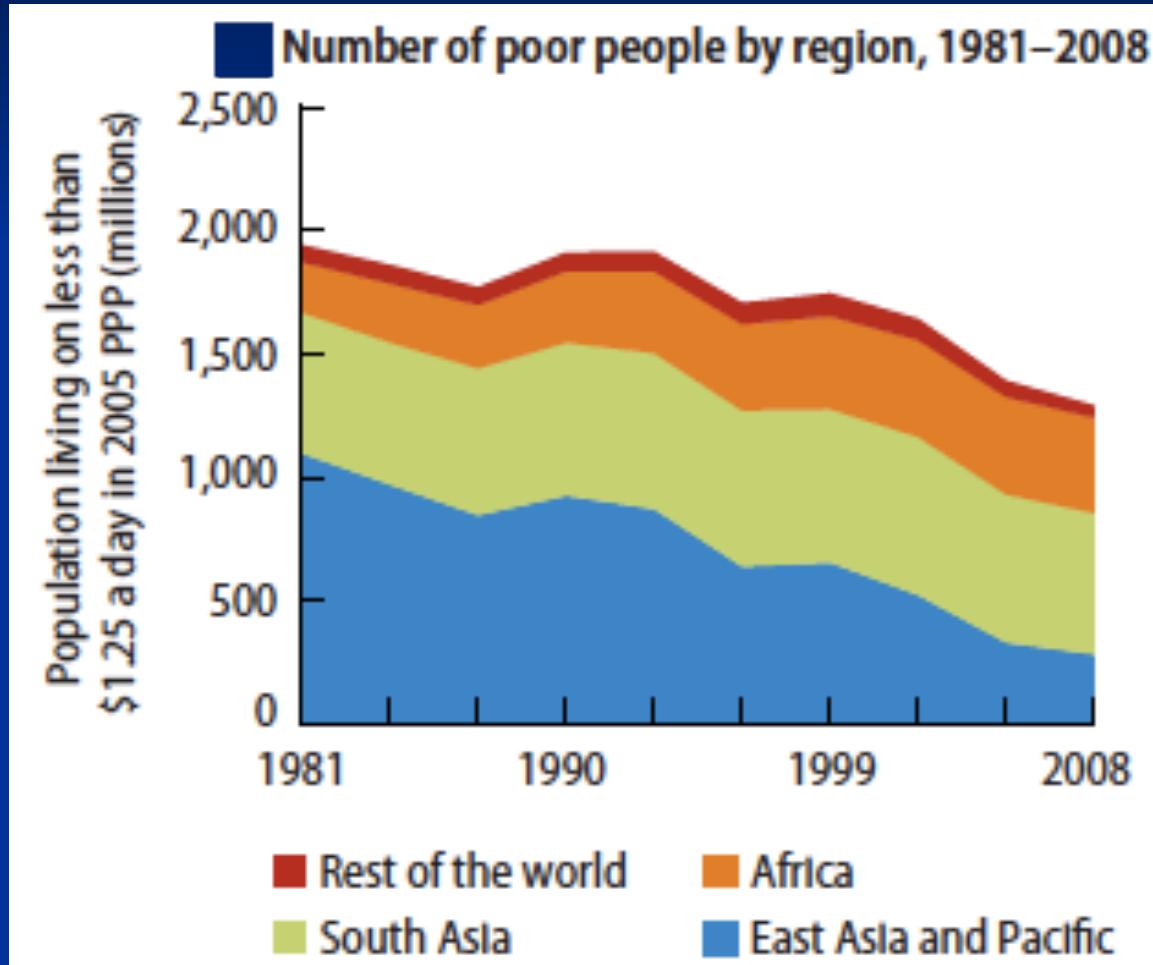


Why do you think all these accelerations started about 1950?



Growing affluence of our world

“World Bank. 2012. The World Bank Annual Report 2012 : Volume 1. Main Report. © Washington, DC. <https://openknowledge.worldbank.org/handle/10986/11844> License: CC BY 3.0 Unported.”

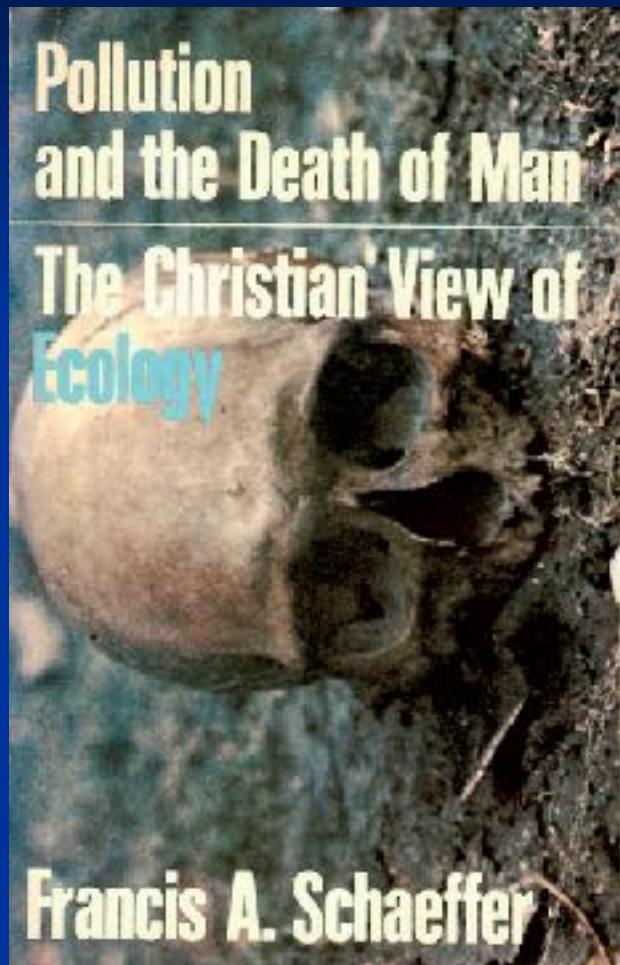


This may be our biggest problem. As the world gets more affluent, there will be much more stress on the planet

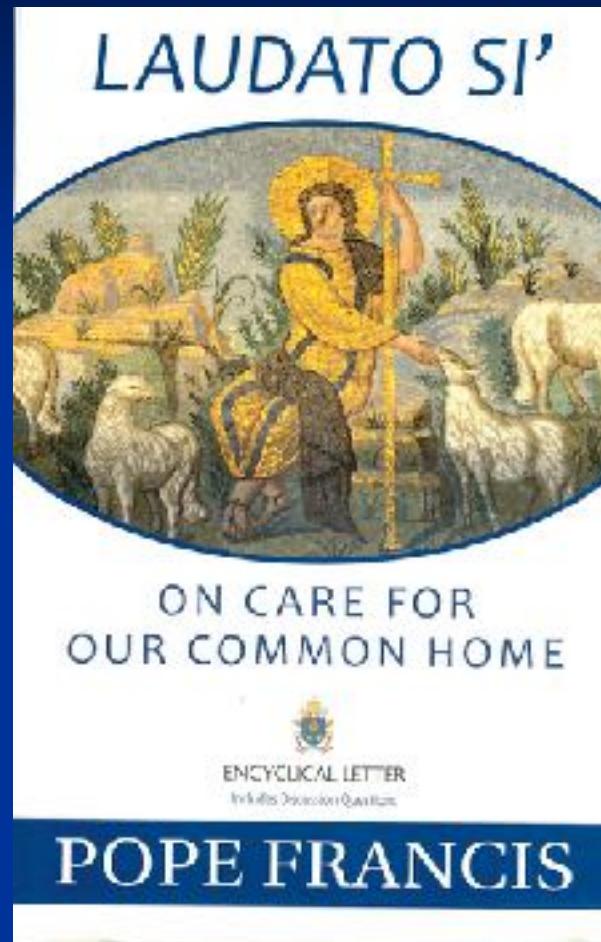
Goal in this paper

- Not trying to deal with sustainable engineering in all its complexity
- Trying to develop an approach to Christian sustainable engineering by looking at insights from two important Christian writers.

Insights from two men named Francis



1970



2015

Images of two men are very different

- Schaeffer is seen by many as a hard core conservative
- Pope Francis is seen by some as a liberal reformer
- I was impressed with how similar were their writings, even though they were written 45 years apart and come from different Christian traditions

Insights from Schaeffer

- He quotes extensively from an article by Lynn White (The Historical Roots of our Ecologic Crisis, Science, Volume 155, pp. 1203-1207)
 - White's perspective is that our problems are not just technological, but stem from our basic world view). White believes this is the result of a Christian world view.

Schaeffer on world view

- Schaeffer disagrees with White's fundamental conclusion, but does agree with White about the importance of world view.
- “Men do what they think. Whatever their world view is, this is the thing which will spill over into the external world. This is true in every area,... in all science and technology as well as in the area of ecology.”

- “It is the biblical view of nature that gives nature a value in itself: not to be used merely as a weapon or argument in apologetics, but of value in itself because God made it.”(page 47)

With respect to dominion

- “When we have dominion over nature, it is not ours ,either. It belongs to God, and we are to exercise our dominion over these things not as though entitled to exploit them, but as things borrowed or held in truest, which we are to use realizing that they are not ours intrinsically.” (page 70)

Example of strip mining

- “Why does strip mining turn the world into an absolute desert?.. What has brought about this ugly destruction of the environment? There is only one reason: man’s greed.” (page 82)

- “It costs more money, at least at first, to treat the land well...it usually takes longer to treat the land properly. And these are the two factors that lead to the destruction of our environment: money and time—or to say it another way, greed and haste. The question is, or it seems to be, are we going to have an immediate profit and an immediate savings of time, or are we gong to do what we really should do as God’s children?” (page 83)

Pope Francis's Encyclical

- He begins with a reference to Saint Francis of Assisi.
 - He “reminds us that our common home is like a sister with whom we share our life and a beautiful mother who opens her arms to embrace us” (page 7)

Francis of Assisi

- Some Protestants get real nervous about Francis of Assisi's comments about our relationship to the rest of creation.
- Note how Francis Schaeffer responds to this very differently:

Schaeffer on Francis of Assisi

- “We have the right to rid our houses of ants; but what we have no right to do is to forget to honor the ant as God made it, out in the place where God made the ant to be. When we meet the ant on the sidewalk, we step over him. He is a creature ,like ourselves, not made in the of God, it is true, but equal with man as far as creation is concerned.
- In this sense “Francis’ use of the term “brothers to the birds” is not only theologically correct, but a thing to be intellectually thought of and practically practiced.”

Pope Francis' Goal

- “Saint Francis, faithful to Scripture, invites us to see nature as a magnificent book in which God speaks to us and grants us a glimpse of his infinite beauty and goodness...Rather than a problem to be solved, **the world is a joyful mystery to be contemplated with gladness and praise.**” (page 13)

- Like Schaeffer, Pope Francis recognizes that motivation is a critical aspect to solving the problems of sustainability.
- He writes “convinced as I am that change is impossible without motivation, and a process of education, I will offer some... guidelines for human development to be found in the treasure of Christian spiritual experience.”

Pope Francis's Arguments

- He weaves three different arguments throughout his encyclical
 - His recommendations are consistent with prior Catholic social teaching
 - I am not in a position to assess this
 - His recommendations are supported by good science
 - Not my main point in this paper
 - His recommendations are supported by scripture

- “We are not God. The earth was here before us and it has been given to us.. Nowadays we must forcefully reject the notion that our being created in God’s image and given dominion over the earth justifies absolute domination over other creatures” page 48)
- This responsibility for God’s earth means that human beings, endowed with intelligence, must respect the laws of nature and the delicate equilibria existing between the creatures of this world.” (Page 49)

- “Believers themselves must constantly feel challenged to live in a way consonant with their faith and not to contradict it by their actions.” (page 131)
- “When people become self-centered and self-enclosed, their greed increases. The emptier a person’s heart is, the more he or she needs things to buy, own and consume.” (page 134)

Conclusions

- Christian faith gives many insights into the problems of sustainable engineering
- Climate change is real and important and Christian engineers need to understand what role they can play in dealing with these issues.
- There are issues of technology, but also issues of motivation

Conclusions

- In working with conservative Christians who are skeptical you may wish to emphasize
 - Our obligation as Christians to be good stewards to the world we live in
 - There are market based approaches to the problem that can help make real progress without resorting to big government solutions

Any Questions ?

Additional Slides

- The following slides are useful to make my main points
 - They were removed to make for a shorter talk at the ASA 2017 Conference

Environment and Sustainability Engineering

- Sustainability engineering includes a concern about the environment, but is a broader topic
- Much discussion about environmental issues center around pollution, but there is much more to this topic

The Gospel of Creation (chapter 2)

- “Faith convictions can offer Christians...ample motivation to care for nature and for the most vulnerable of their brothers and sisters.” (page 46)
- “The creation accounts in the Book of Genesis contain...profound teachings about human existence...They suggest that human life is grounded in three fundamental and closely intertwined relationships: with God, with our neighbor, and with the earth itself.” (page 47)

- “Judeo-Christian demythologized nature. While continuing to admire its grandeur and immensity, it no longer saw nature as divine...A fragile world, entrusted by God to human care, challenges us to devise intelligent ways of directing, developing and limiting our power.” (pages 55-56)

- “Inner peace is closely related to care for ecology and the common good because, lived out authentically, it is reflected in a balance lifestyle together with a capacity for wonder which takes us to a deeper understanding of life.” (Page 146)

- “Christian spirituality proposed an alternative understanding of the quality of life, and encourages a prophetic and contemplative lifestyle, one capable of deep enjoyment free of the obsession with consumption.” (page 144)