Society of Actuaries in Ireland

What do the actuaries of the future think actuaries could be doing in the future

Colm Fitzgerald, Ronan Coleman, Marina Cunningham, Louise Gannon, Scott McElhinney, Oisin Morgan, Rebecca O'Mahoney, David Watters, Krzysztof Wroblewski

Disclaimer

The views expressed in this presentation are those of the presenter(s) and not necessarily those of the Society of Actuaries in Ireland or their employers.

Introduction

- Colm Fitzgerald (UCD)

- UCD Bachelor of Actuarial & Financial Studies (BAFS) students:
  - Ronan Coleman
  - Louise Gannon
  - Oisin Morgan
  - David Watters
  - Marina Cunningham
  - Scott McElhinney
  - Rebecca O'Mahoney
  - Krzysztof Wroblewski

  (All are 1st or 2nd year students)

Background

- New UCD BAFS module
  - Introduction to Actuarial & Financial Studies
- Brief overview of what is an actuary
- Module includes presentations from actuaries and other professionals
  - Discuss their careers and give advice to the students
- Module assessed by a group project on applying actuarial skills to areas where actuaries could work in the future
  - Graded based on imagination, passion and analysis

Thank you!

- Thanks to - Tom Donlon, Eva McEneaney, Joseph Burke, Laura Connolly, Eamonn Phelan, Jane Gleeson, Eoghan Burns, Linda Kerrigan, Fergal Cox, Dr. John Cullinan, Bryan O'Connor, Dr. Monika Smatralova, Paul Kenny, David MacCurtain, Paul O'Faherty, Andrew Smith, Sandra Rockett, Shane O'Farrell, Colm Fagan, Pat Ryan and Prof. Phil Boland

What is an actuary?

From the perspective of others:

A professional who uses numbers to make judgments about the future

What is an actuary?

From our perspective:

$$\Sigma\, E(CF_t) / (1+i_t)^t$$

where CF_t = *cash flow at time t*

$E(CF_t)$ = *the expected value of* CF_t

i_t = *the appropriate discount rate for* CF_t

What’s the story about moving into wider fields?

What’s the story about moving into wider fields?

Actuaries in Sustainable Development & Microinsurance

"Not achieving these goals would be the biggest market failure of our time." Mark Wilson, former CEO, Aviva Plc

Actuaries in Sustainable Development & Microinsurance

Microinsurance:

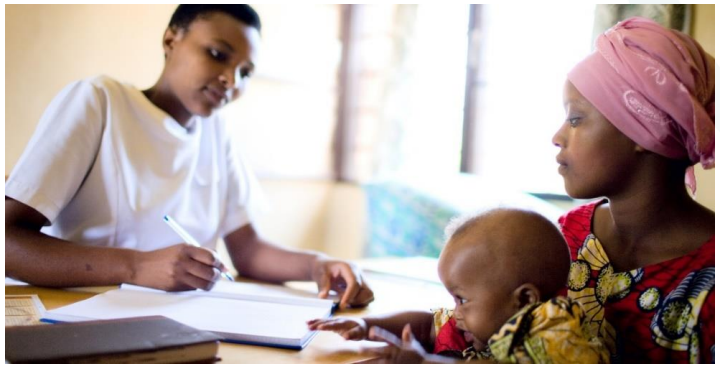
Insurance targeted at low-income people in developing countries

Actuaries in Sustainable Development & Microinsurance

	Direct premiums written, 2017	Percent change from 2016	Share of world market	Share of world population
Advanced markets	$3,819,644	-0.6%	78.1%	14%
Emerging markets	$1,072,050	10.3%	21.9%	86%

Source: Swiss Re, *sigma*, No. 3/2018

281 million lives are covered under microinsurance policies (Microinsurance Network), out of a potential market of 4 billion people (Swiss Re).



Actuaries in Sustainable Development & Microinsurance

Advances already made by actuaries

- In practice, high-risk loadings are often used to offset the uncertainty involved in risk assessment. The result is an overestimation of risk affecting prices and demand.
- Through a case study from the Philippines, Inma Peña (PhD, Actuary) proposes a new approach:
  - It is possible to obtain more accurate premiums with a more sophisticated pricing methodology, using GLM models, for the microinsurance market.

Actuaries in Sustainable Development & Microinsurance

“One of the constraints inhibiting the expansion of better insurance services for more low-income households is sufficient technical expertise.”

“There are certainly lots of people who understand development, and even more who understand insurance, but there are very few experts in insurance and development.”

Craig Churchill, Team Leader, ILO Impact Insurance Facility, and former Chair of the Microinsurance Network

Society of Actuaries in Ireland

Actuaries & Waste Management

David Watters 1st Year BAFS UCD

Introduction

We categorised our project under three headings:

1. Waste of resources in finance and industry
2. Technology
3. Renewable Energy

Waste of Resources in Finance & Industry

- Industrial Symbiosis
- Opportunities for actuarial input in the Irish economy

Technology

- Technology has made modern-day Waste Management systems safer, more efficient, and more productive.
- SmartBin & Digesters
- Potential for Actuarial work

Renewable Energy

Benefits associated with renewable energy:

1. Less emissions of gases such as CO2 and methane
2. Improved public health worldwide

But where do actuaries come into play here?

- ❖ Risk Management
- ❖ Cash Flows

Conclusion

- Waste Management industry is a major growth area
- Waste Management presents new actuarial challenges

Thanks for listening!

Environmental Finance

By Ronan Coleman and Marina Cunningham

Markets within Environmental Finance

Markets within environmental finance where actuaries could apply their skills include

- Climate Change
- Weather Risk Management

Climate change: Progress so far…

- IAA has established an Environmental Working Group dedicated to environmental affairs

- American Academy of Actuaries and the Society of Actuaries (Canada) have set up a Climate Change committee, which is working on the Climate Change Index project.

- Chair of IFoA issued a risk alert to raise awareness on the financial risks created by climate change.

Why are Actuaries suited for this area?

- Setting climate change policies requires an understanding of economics, part of the multi-disciplinary skillset of actuaries.
- They are trained specialists in statistics and probability, also very adaptable in the workplace.
- They have the ability to use their financial knowledge and calculus skills to set carbon prices and assess the budgetary impact of increased incidence of disease.

Weather Risk Management

- Many industries in our economy such as transportation and agriculture are extremely sensitive to weather conditions.

- Weather Risk Management is a type of risk management done by organisations to address potential financial losses caused by adverse weather conditions on those entities with natural exposure to weather.

Weather Risk Management cont.

- They set up a financial contract with a separate legal entity, that will assume the financial weather risk for them.

- In this contract, they must pay the buyer a pre-set amount of money (a “premium”) which will correspond to the loss or cost increase imposed by the disruptive weather.

What can the actuaries do?

- In calculating the premium imposed on the insured, financial instruments called weather derivatives are used.

- Weather derivatives are index-based instruments that usually use observed weather data at a weather station to create an index on which a payout can be based.

- The broker will require the skills of highly-skilled professionals like actuaries, to employ a range of techniques from the actuarial, financial and meteorological fields to analyse the data and determine a fair price to be charged.

Why are actuaries particularly suited for this role?

- In their traditional roles, an actuary must collect and collate relevant statistical data for further study and analysis.
- They must perform quantitative analysis and decision making in conditions where data is limited and unreliable, which would be the case in these circumstances.
- It is the responsibility of the actuary to create in-depth reports containing charts and tables making inferences on the data and to explain these reports to all parties with a vested interest.

Thank you for your attention!

Actuaries and Artificial Intelligence

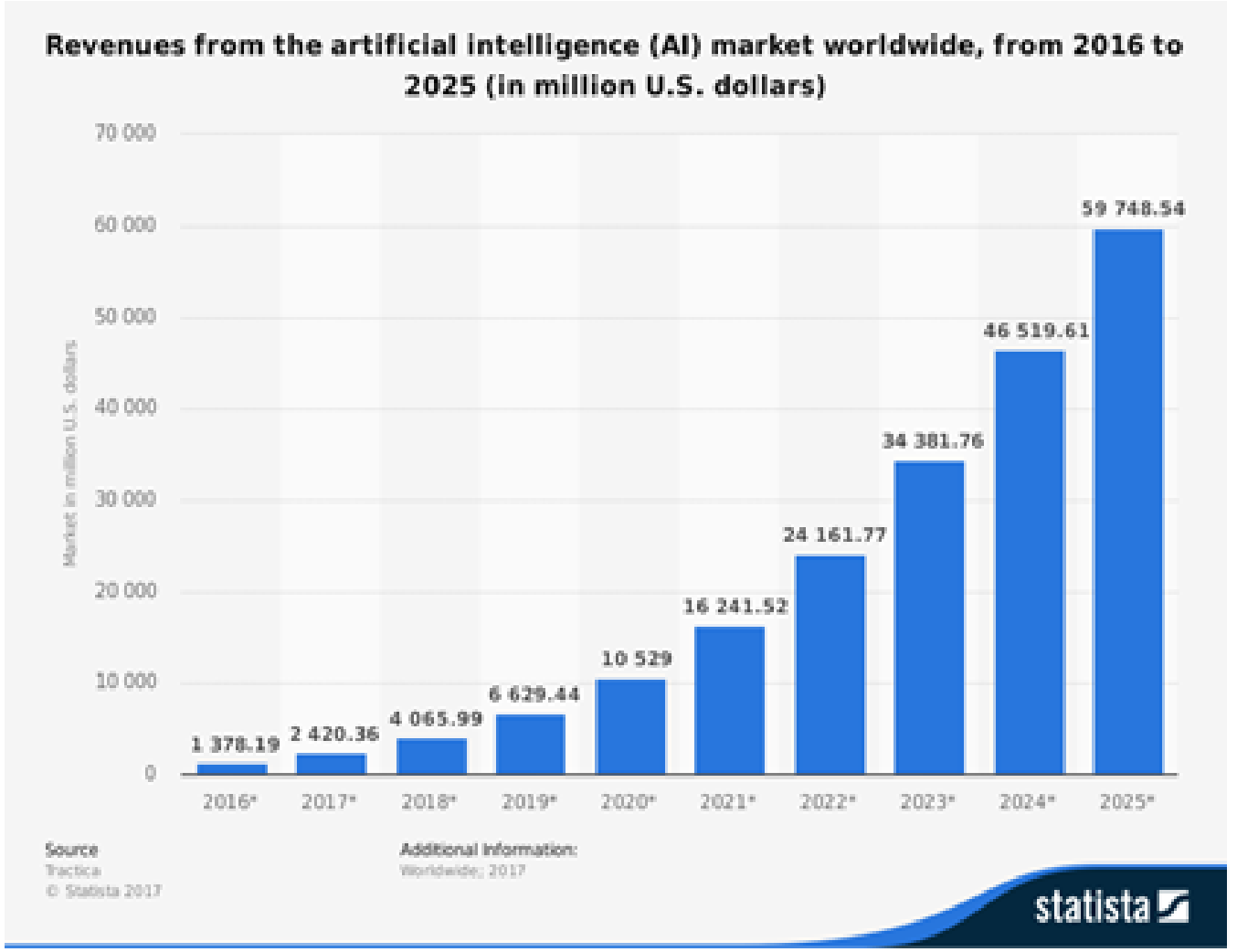
PRESENTATION FOR THE SOCIETY OF ACTUARIES IN IRELAND

24th MAY 2019

BY: SCOTT MCELHINNEY and OISIN MORGAN

What is AI?

- *Growth Industry*
- *Platform or problem for actuaries?*
- *Catalyst for change in the role of an actuary*



Trading

- *Visual Perception*
- *Algorithmic trading*
- *Unemotional thinking*
- *Regulation*
- *Machine errors*

Sports Betting

- *Development of algorithms*
- *Interpretation of the odds*
- *Human judgement in sport*
- *Intangibles*

Car Insurance

- *Fewer accidents*
- *Change in risk profiling*
- *Evaluations of roadworthiness*

"Volvo will accept full liability whenever one of its car are in autonomous mode"
- Volvo Car Group CEO

Thank you for your attention.

Actuaries in the Energy Industry

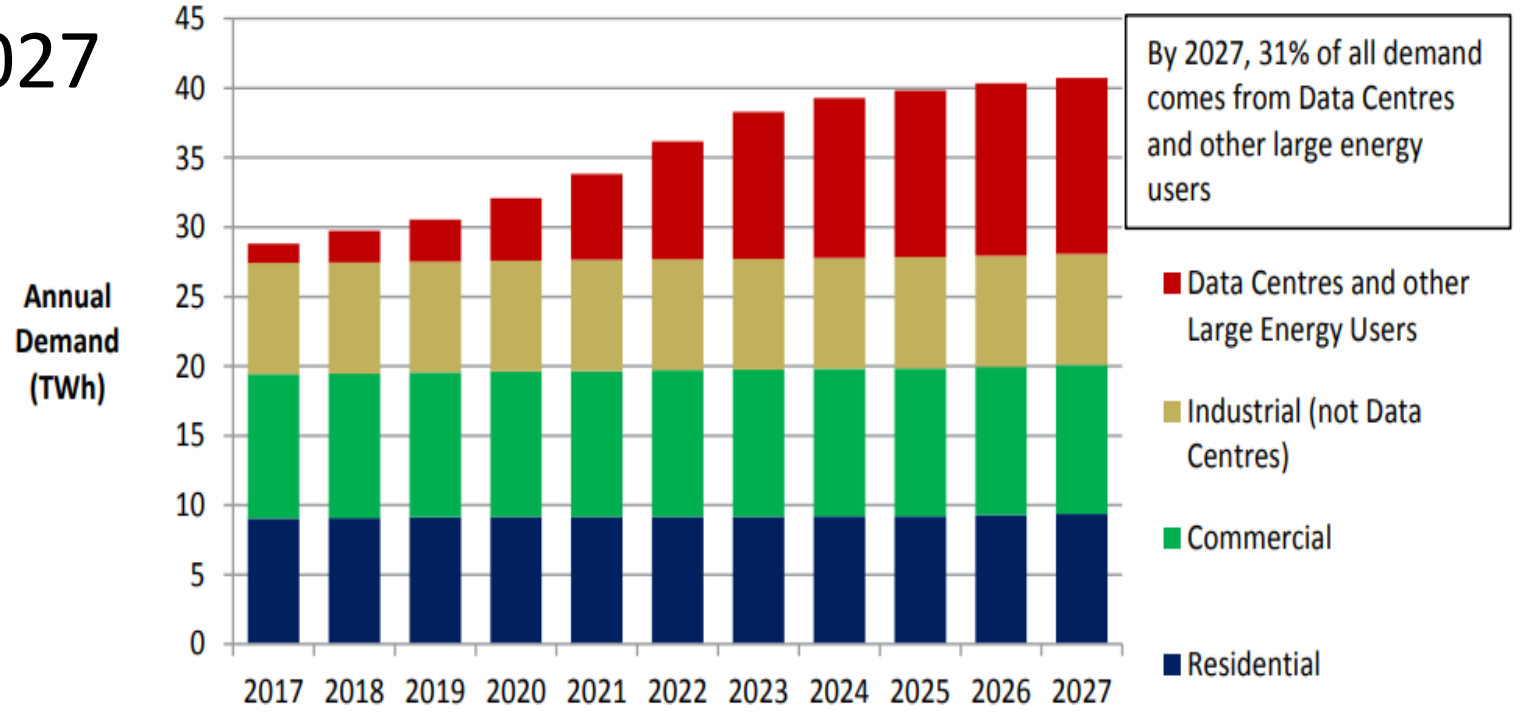
Krzysztof Wroblewski
2nd Year UCD BAFS

Overview

- Power Demand Forecasts
- Demand fluctuations
- Market Structure
- Smart Metering

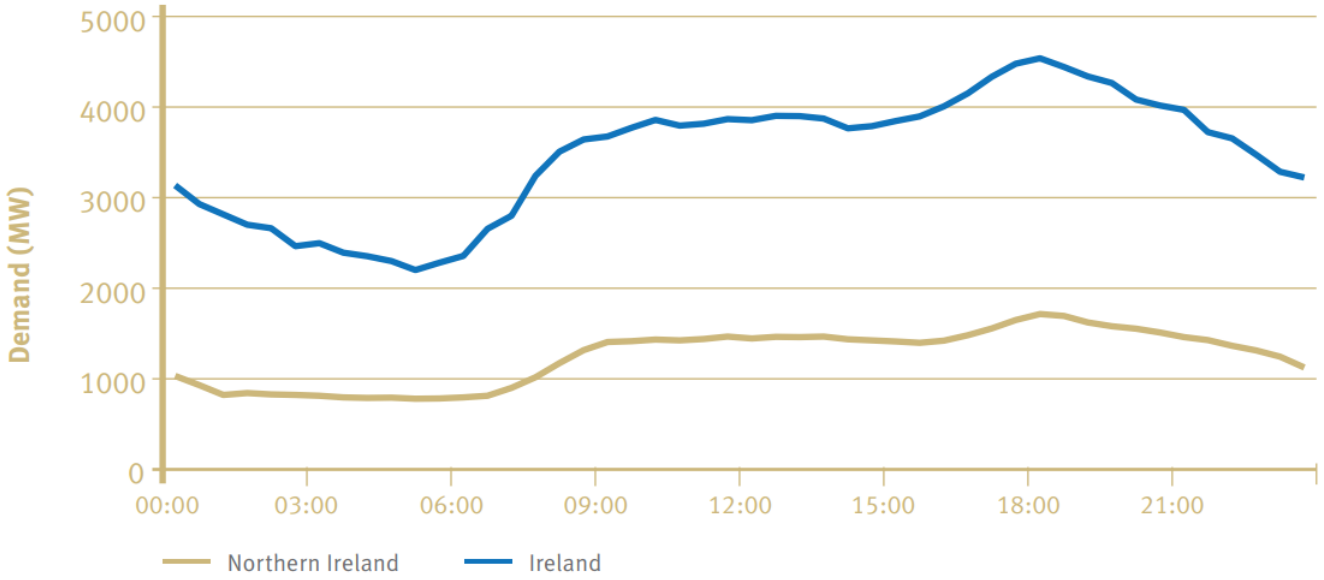
Power Demand Forecast

- Increase of 50% to 2027
- Data Centres
- Renewable targets
- Natural disasters
- Catastrophe Bonds



Supply & Demand Fluctuation

- Similar to modelling risk
- Weather
- “TV pick-up”
- Unreliable wind power
- Capacity Payments



Market Structure

- Single Energy Market (SEM)
- All energy traded here
- Generation separated from retail electricity
- Smoothing similar to life assurance
- Lower Prices

Smart Meters

- Replacing old mechanical meters from 2019 to 2023
- Huge source of data
- Reduction in power usage of 2.5%, peak 8.8%
- Carbon footprint

Actuaries in the Justice System- Calculating Criminal Punishment

Rebecca O'Mahoney

The Current System

How can Actuaries Help?

In Conclusion

Improve socio-economic impact

Life insurance premiums - based on risk

Criminal Punishment should also be risk based

Other projects by UCD BAFS students

- Actuaries in farming and in reducing risk in agriculture
- Actuaries in town and regional planning
- Actuaries and catastrophe modeling
- Actuaries in climate change and in climate modeling
- Actuaries in estimating the effects on new legislation
- Actuaries in population modeling and in energy modeling
- Actuaries and the wind energy industry

Thank you for your attention!

Any questions are very welcome?