

NEW NORTH

STRATEGIC DISCUSSION

21 April 2017





Intelligently Create **Your** Future, Today.

David Beurle

The challenge for today

- *Explore the future*
- *Ask the hard questions*
- *Think creatively*

The outcome is an understanding the New North strategic framework and where it might evolve.



January 2015

CITIES OF THE FUTURE

ANTICIPATING TRENDS AND POSSIBILITIES



March 2015

THE FUTURE OF MANUFACTURING

BUILDING THE FUTURE THROUGH AGILITY AND INNOVATION



'SCENARIOS OF THE FUTURE'

EDINA, MINNESOTA

Report from the Vision Edina Future Think Tank workshop conducted on September 9th and 11th, 2014



'VIEWS OF THE FUTURE - NEBRASKA IN 2030'

NEBRASKA ECONOMIC DEVELOPMENT ASSOCIATION



ALLEN COUNTY OHIO DEFENSE INITIATIVE 'SCENARIOS OF THE FUTURE'

ALLENCOUNTY OHIO



GREATER LIMA REGION STAKEHOLDER ECO-SYSTEM ANALYSIS



INDUSTRY CLUSTER ECONOMIC IMPACT ANALYSIS



March 2016



THE FUTURE OF FOOD

FEEDING THE WORLD - THE COMING FOOD REVOLUTION



THE FUTURE OF MANUFACTURING

BUILDING THE FUTURE THROUGH AGILITY AND INNOVATION



Forces impacting the
world and regions

What are the
emerging macro
drivers..

future→iQ

Create Future Intelligence™

Global population growth and urbanization

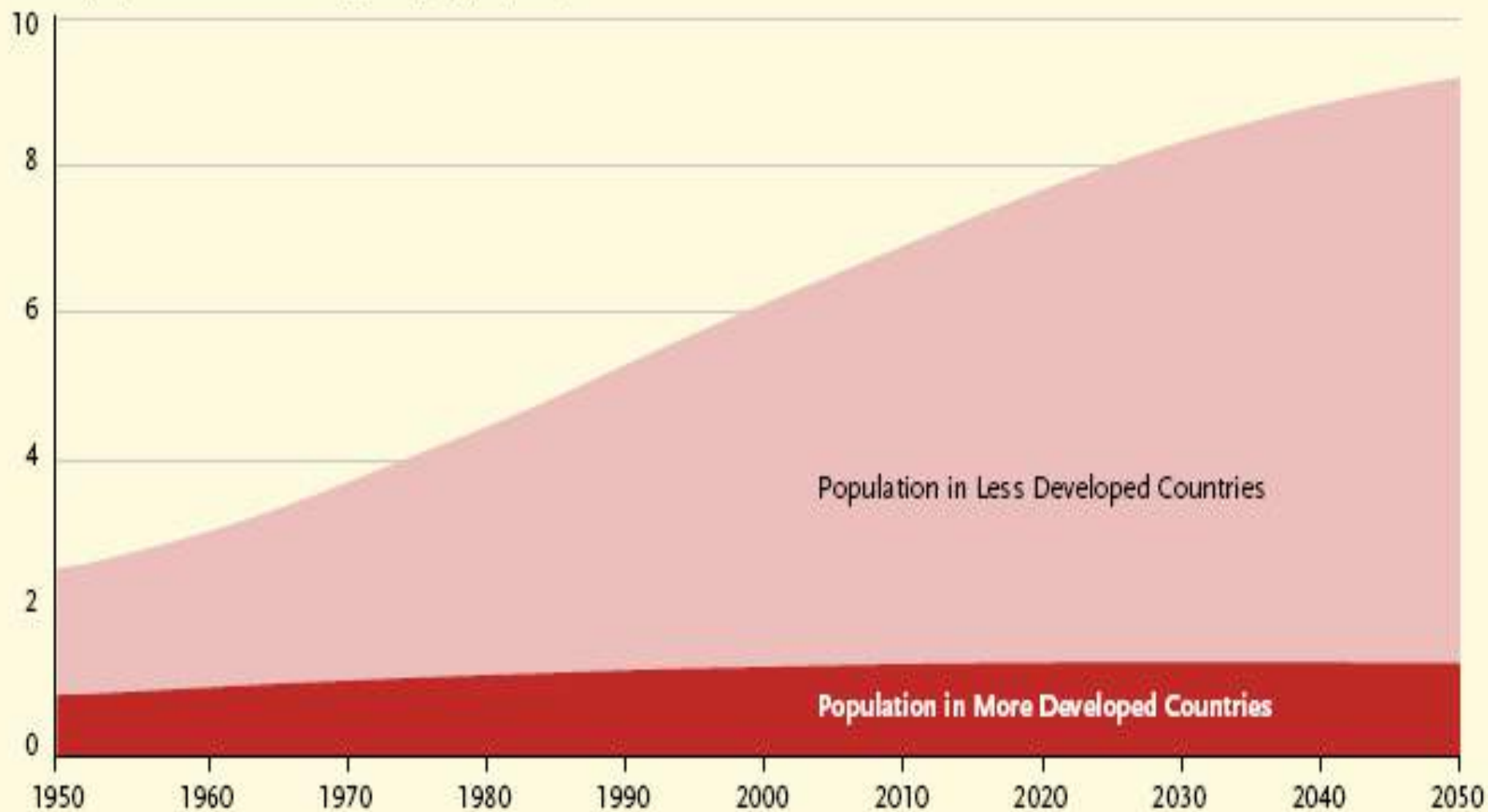
future→iQ

Create Future Intelligence™

www.future-iq.com

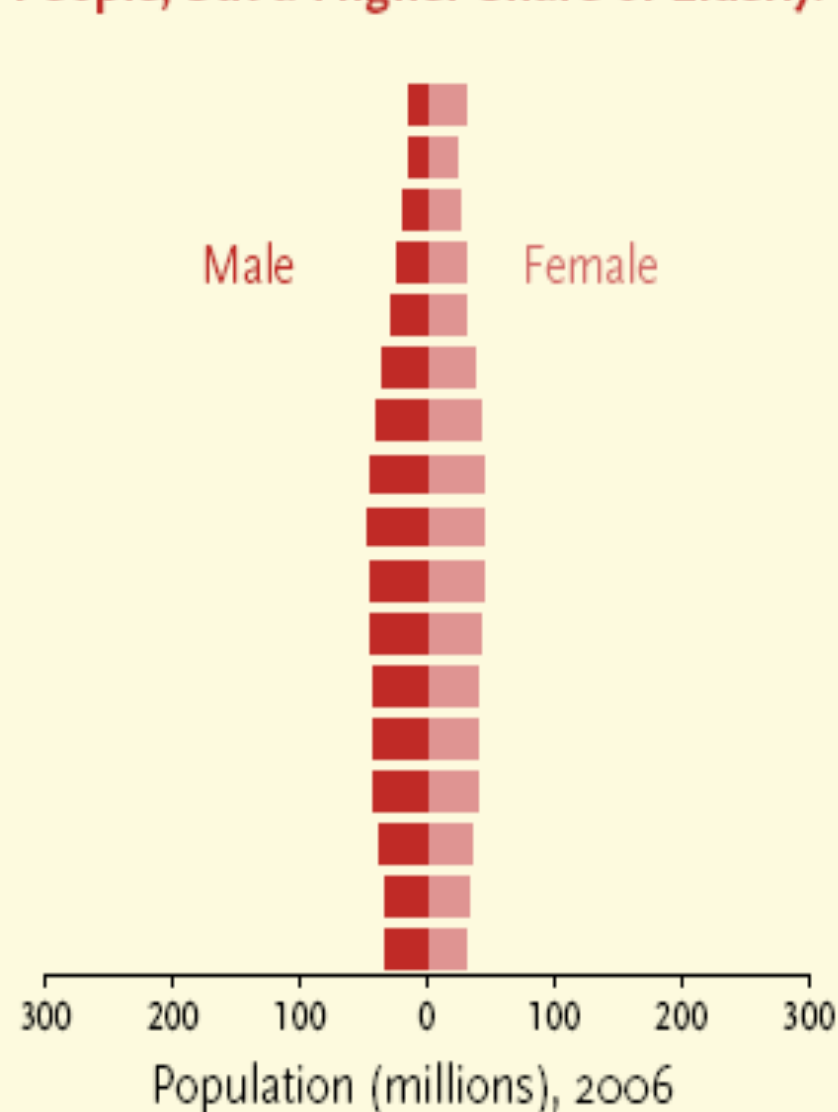
Global Population Growth Is Driven By Developing Countries.

World population in billions, 1950-2050 (projected)

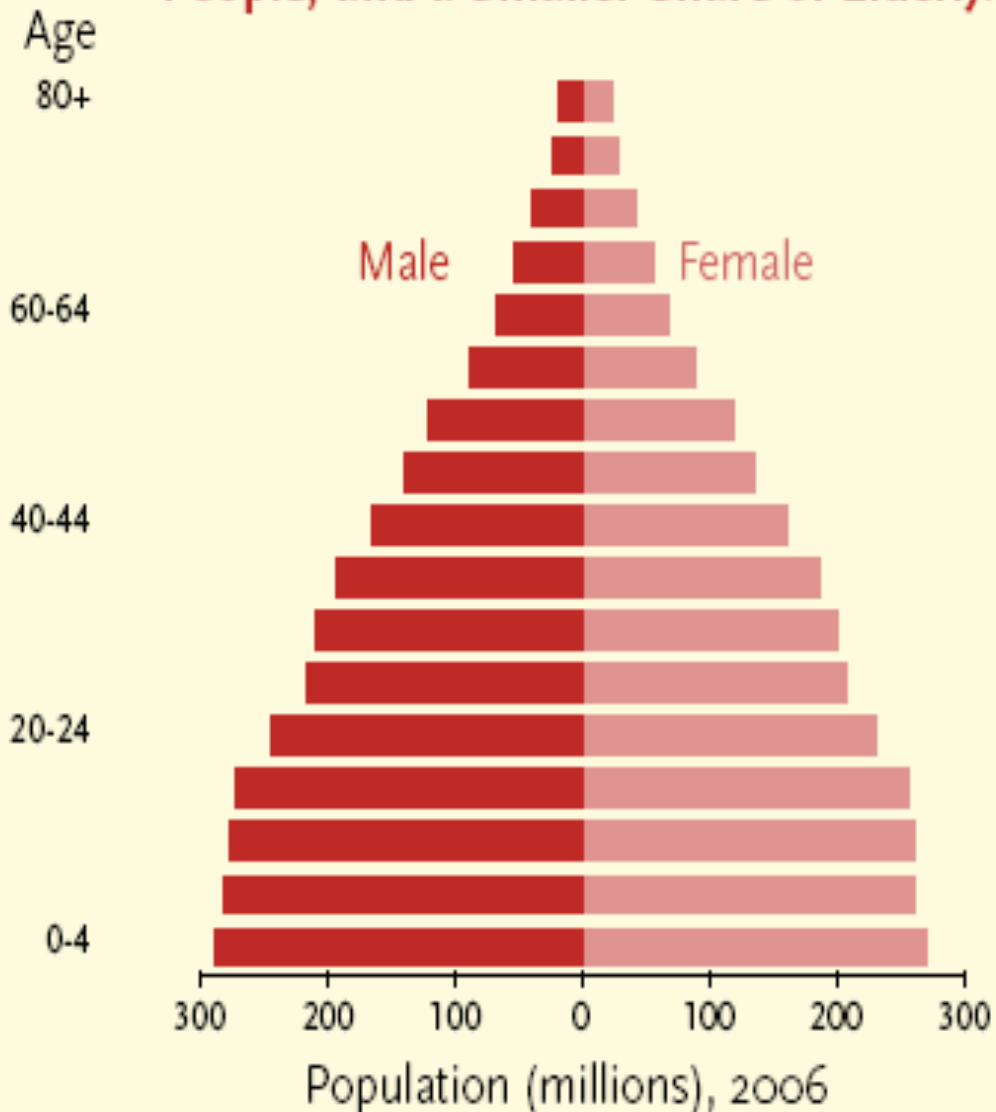


SOURCE: United Nations, *World Population Prospects: The 2006 Revision* (2007).

Developed Countries Have Fewer Young People, but a Higher Share of Elderly.



Developing Countries Have More Young People, and a Smaller Share of Elderly.



SOURCE: United Nations, *World Population Prospects: The 2006 Revision* (2007).

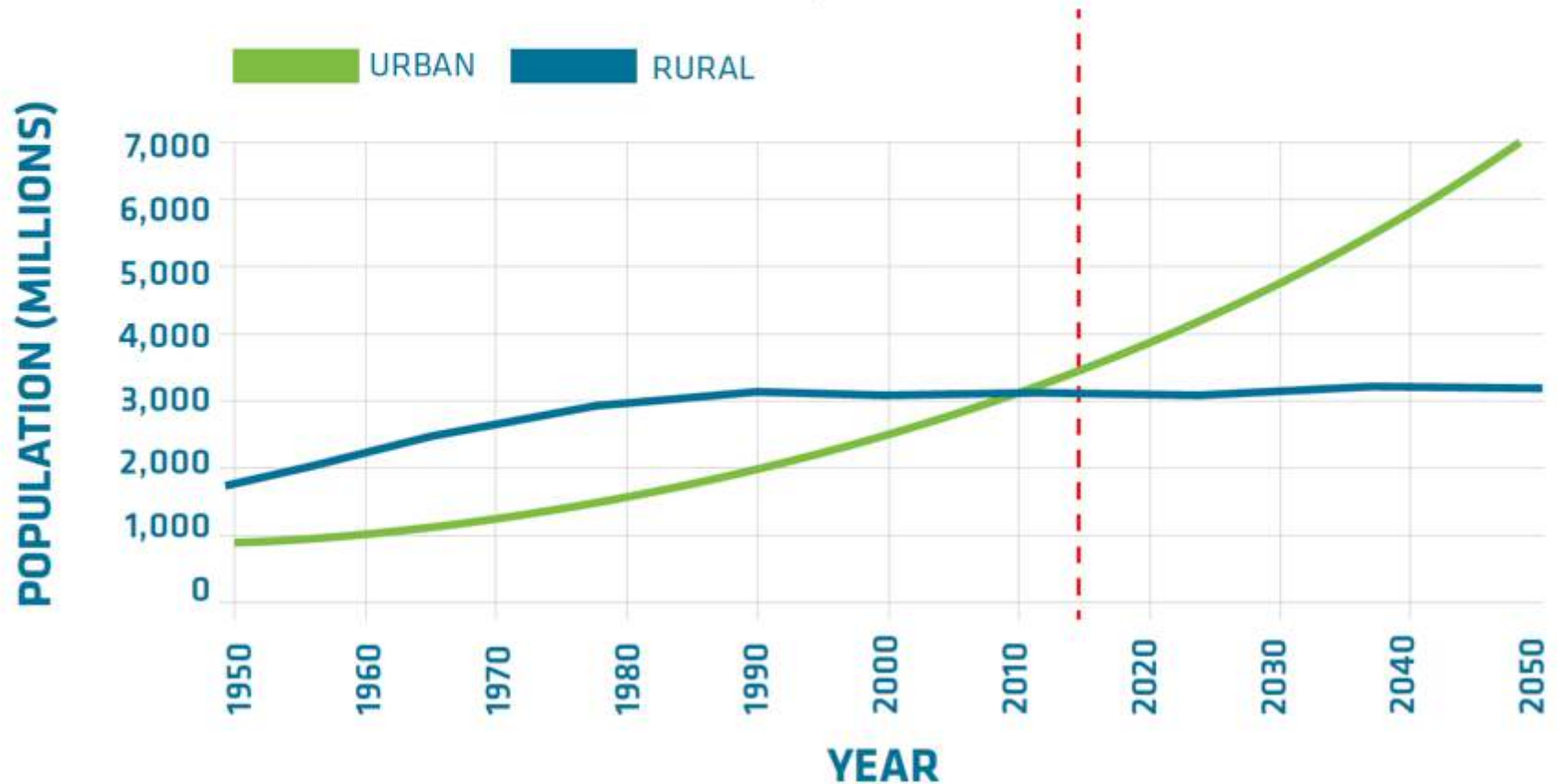
ESTIMATED MEDIAN AGE IN SELECTED COUNTRIES,



“The urban population in 2014 accounted for 54% of the total global population, up from 34% in 1960, and continues to grow.”

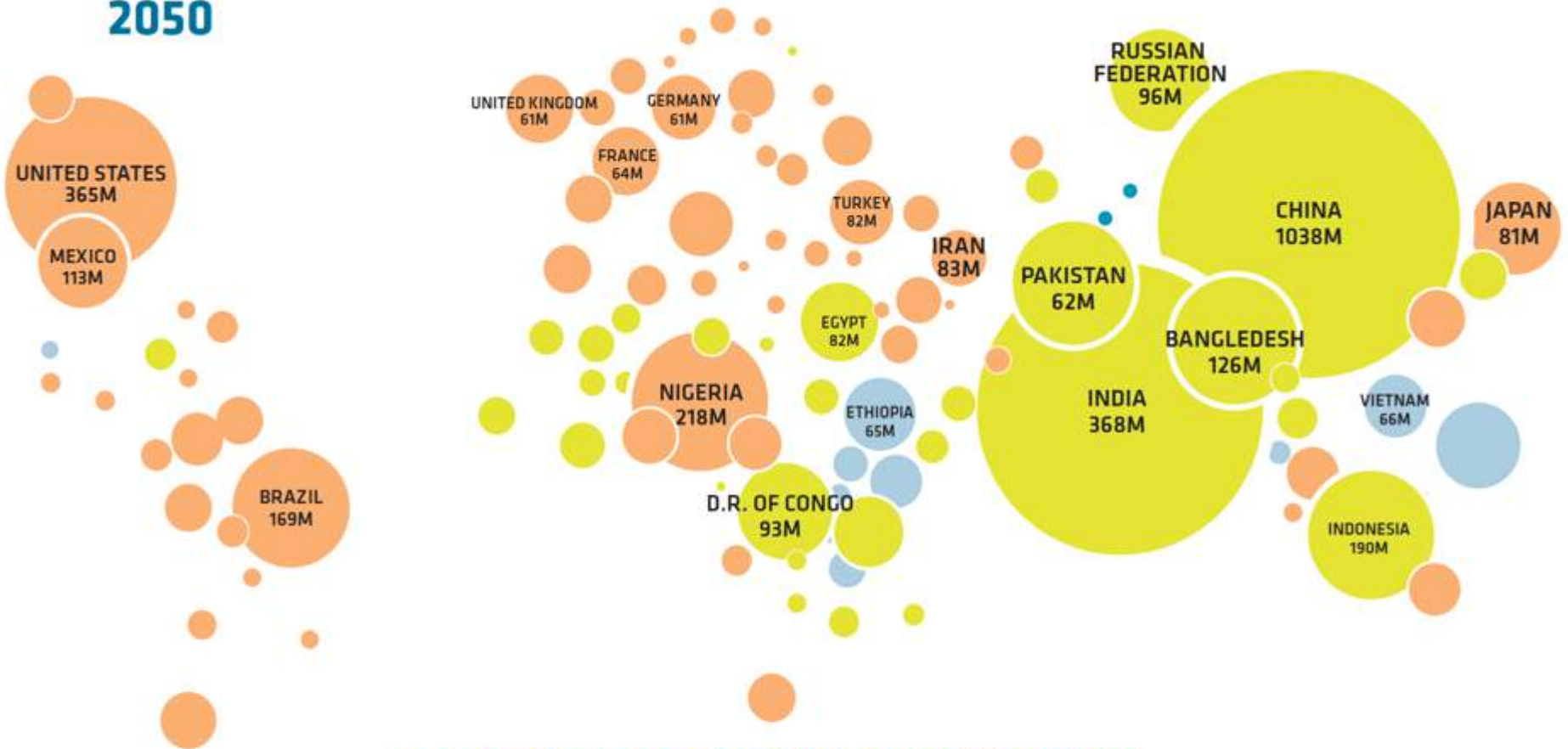
World Health Organization (2015)

URBAN AND RURAL POPULATION OF THE WORLD, 1950-2050



Source: United Nations, Department of Economic and Social Affairs, World Urbanization Prospects, The 2014 Revision.

2050

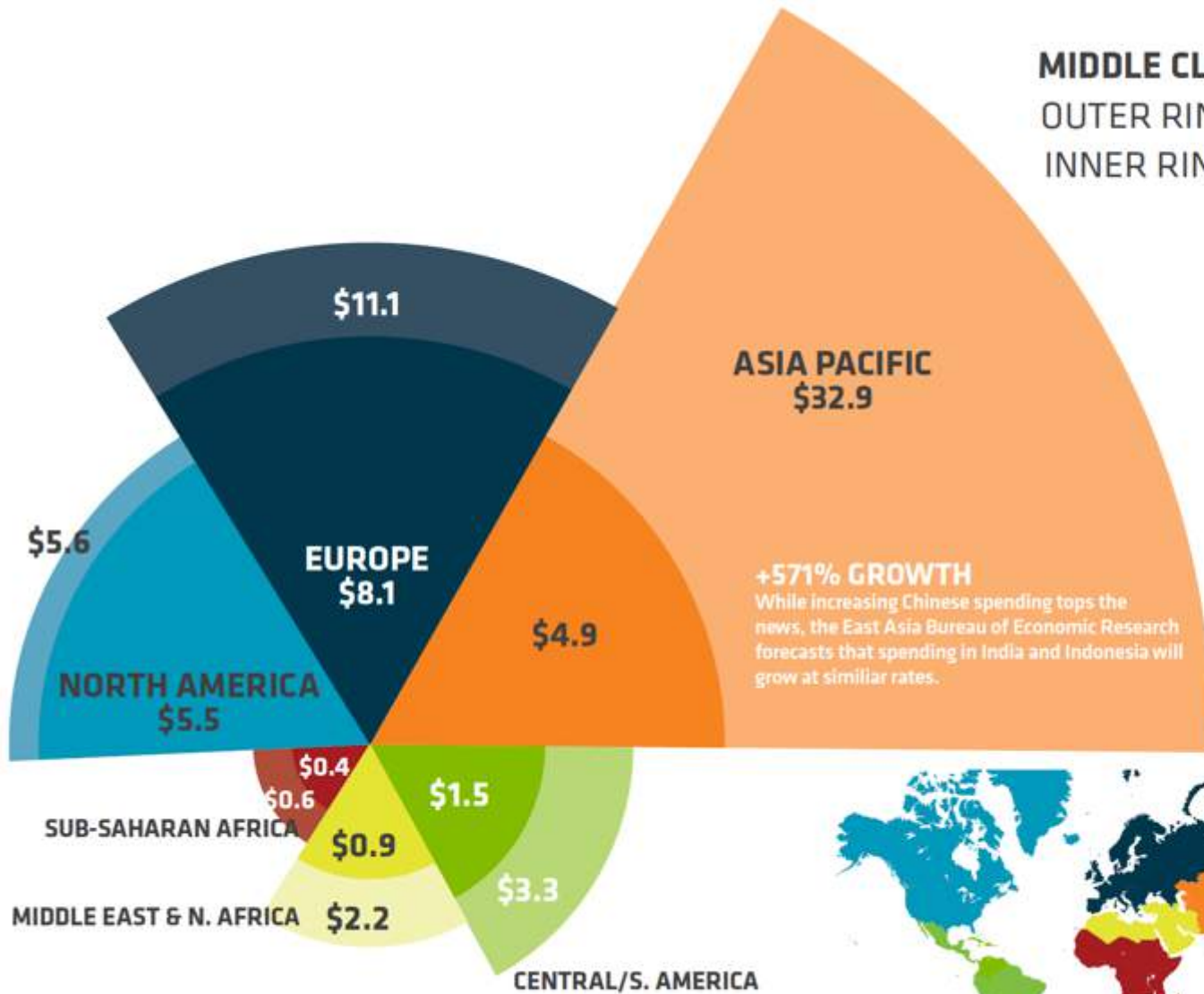


72% WORLD URBAN POPULATION

THIS GRAPHIC DEPICTS COUNTRIES AND TERRITORIES WITH 2050 URBAN POPULATIONS EXCEEDING 100,000. CIRCLES ARE SCALED IN PROPORTION TO URBAN POPULATION SIZE.

Macro-economics and shifting power

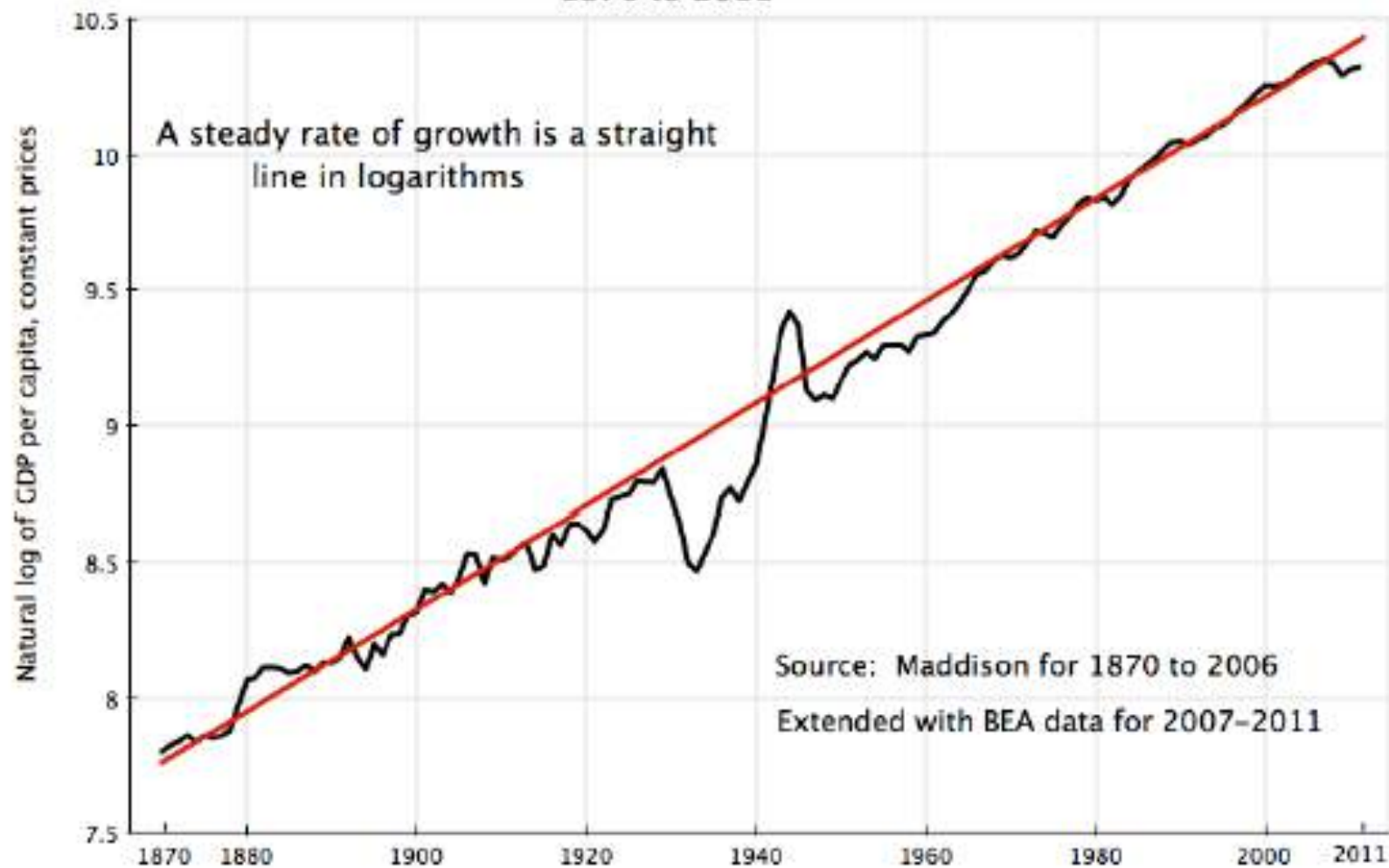
MIDDLE CLASS CONSUMER SPENDING
 OUTER RING: 2030 IN TRILLIONS, USD
 INNER RING: 2009 IN TRILLIONS, USD



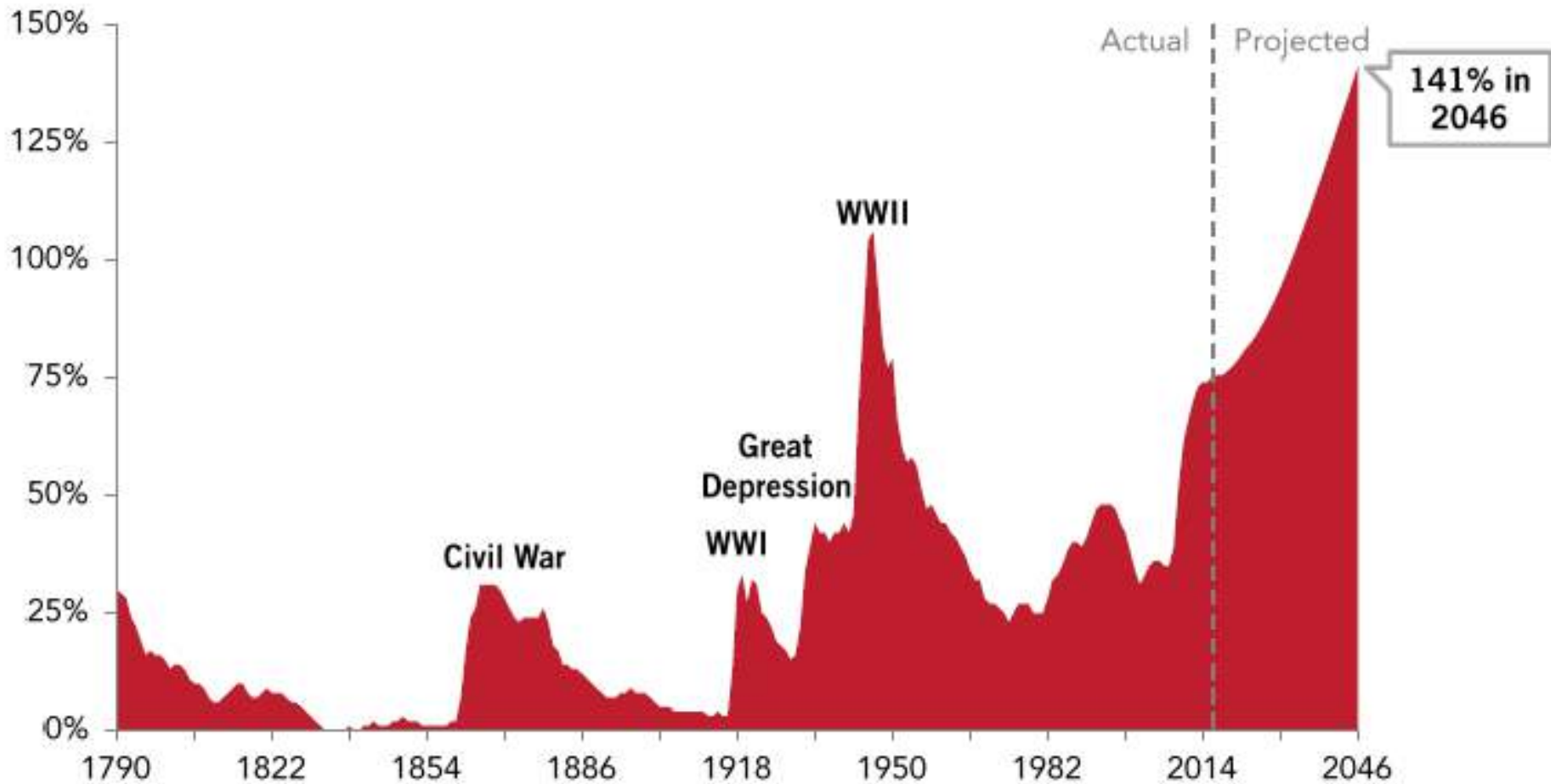
Source: Kou, L. 2013. The world's middle class will number 5 billion by 2030. Quartz.
 Figures based on OECD, 2012. An emerging middle class.

Economic growth

GDP per Capita of the US, in logarithms
1870 to 2011

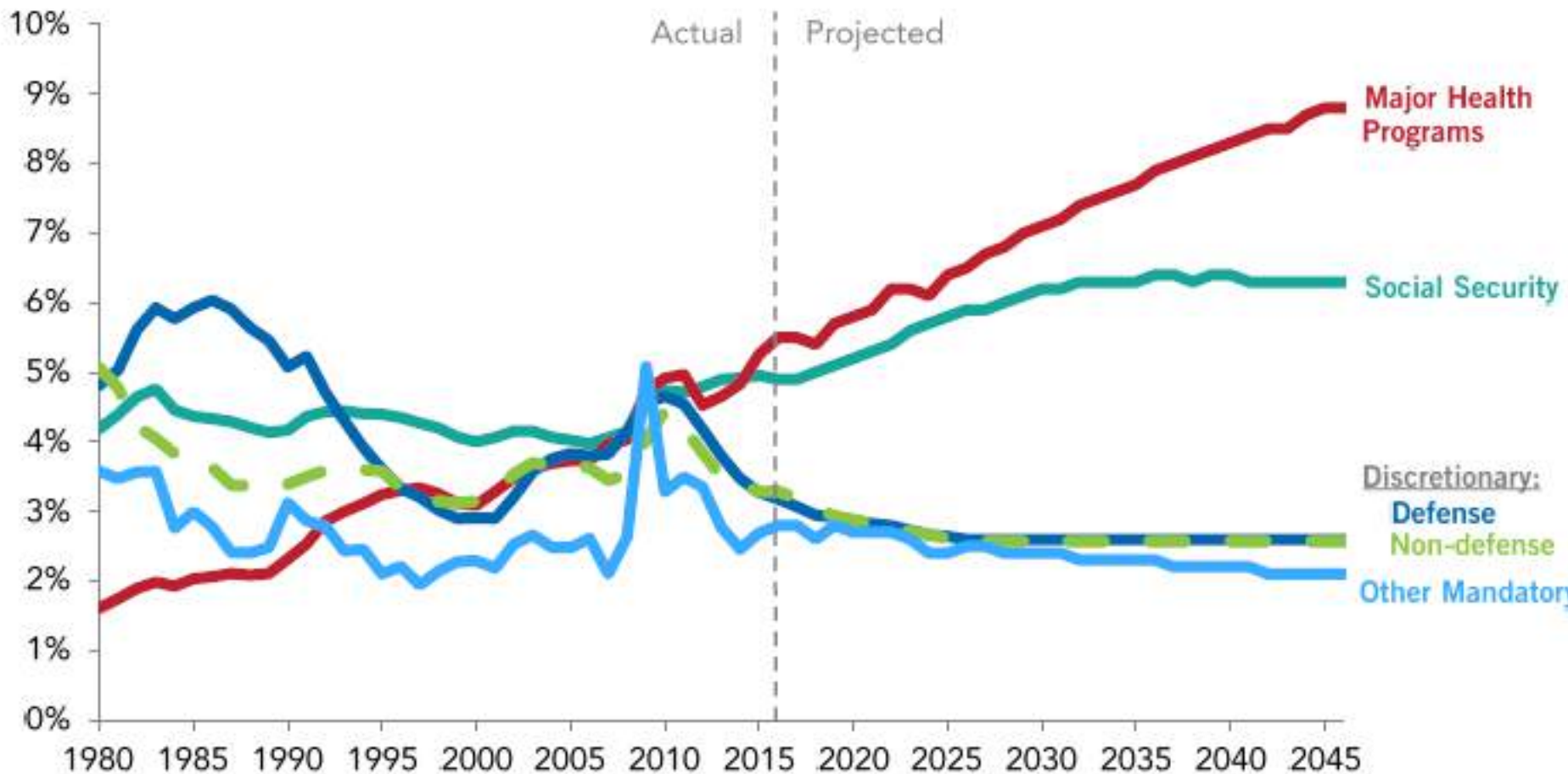


DEBT HELD BY THE PUBLIC (% OF GDP)



SOURCE: Congressional Budget Office, *The 2016 Long-Term Budget Outlook*, July 2016. Compiled by PGPF.

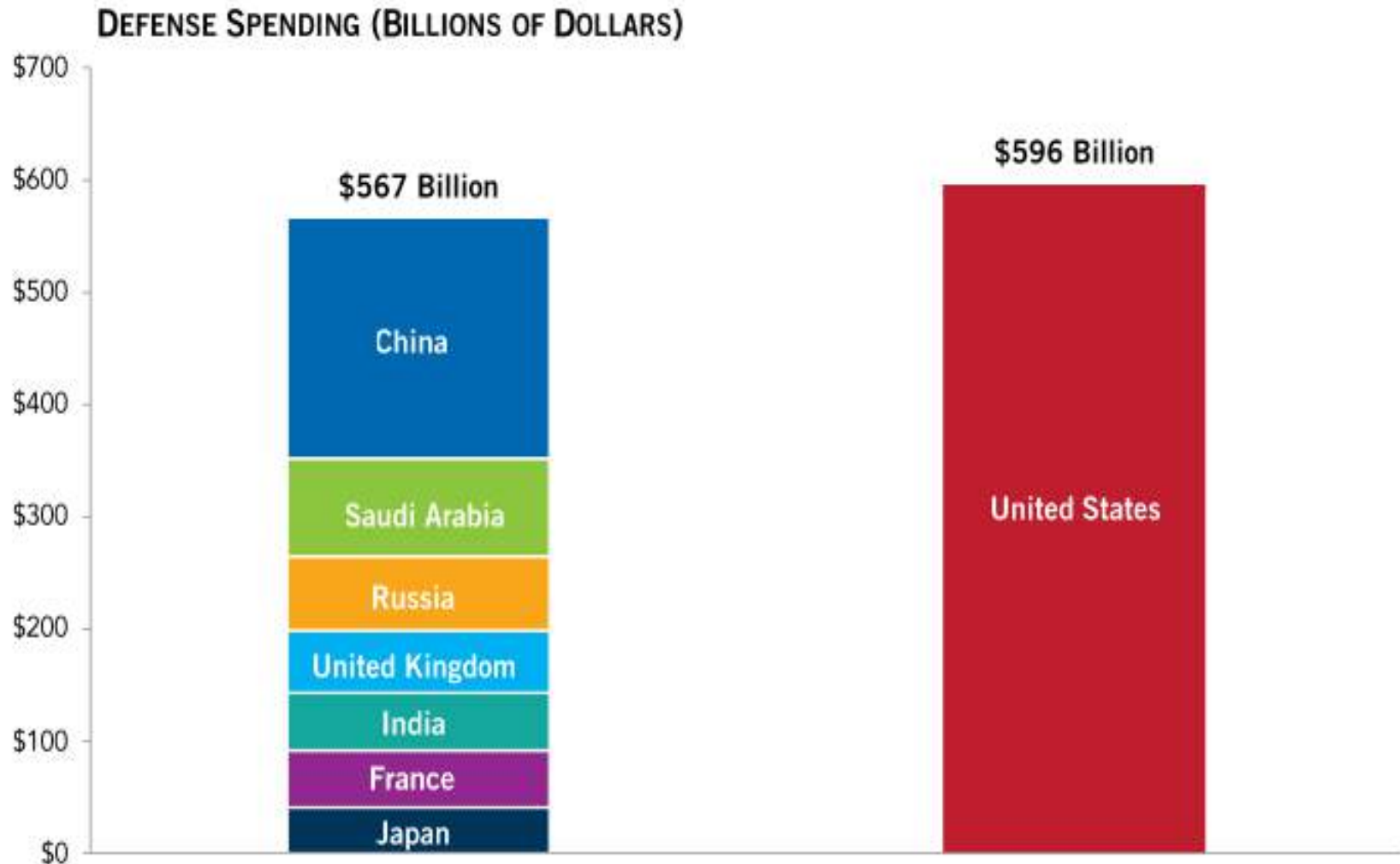
FEDERAL SPENDING (% OF GDP)



SOURCE: Congressional Budget Office, *Updated Budget Projections: 2016 to 2026*, March 2016; Congressional Budget Office, *The 2016 Long-Term Budget Outlook*, July 2016, and PGPF projections based on CBO data.

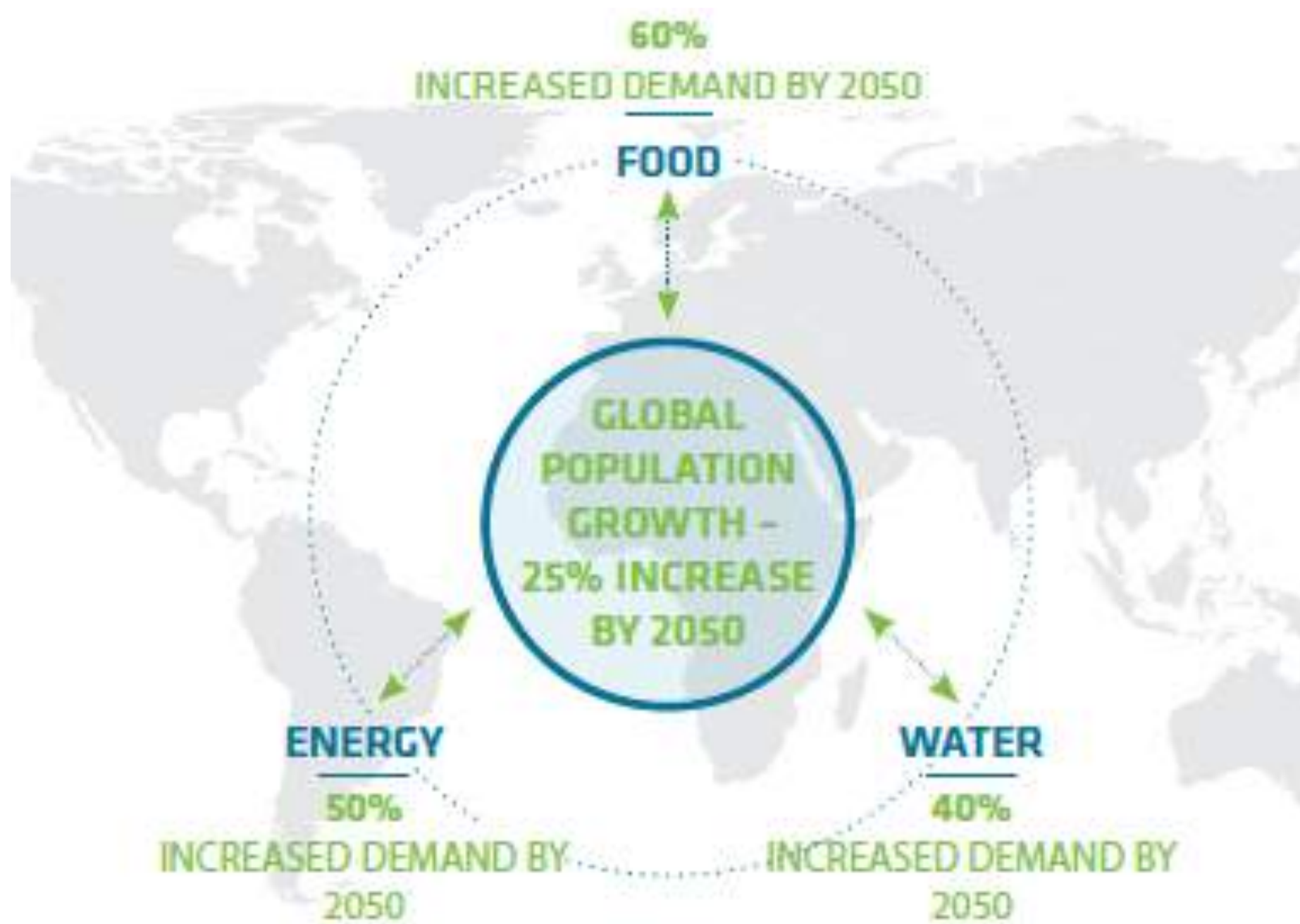
NOTE: Major health programs include Medicare (net), Medicaid, Children's Health Insurance Program (CHIP), and the health exchanges.

The United States spends more on defense than the next seven countries combined



SOURCE: Stockholm International Peace Research Institute, *SIPRI Military Expenditure Database*, April 2016. Data are for 2015. Compiled by PGPF.
NOTE: Figures are in U.S. dollars, converted from local currencies using market exchange rates.

Energy + Water + Climate Change + Food



60%

INCREASED DEMAND BY 2050

FOOD

GLOBAL
POPULATION
GROWTH -
25% INCREASE
BY 2050

ENERGY

50%

INCREASED DEMAND BY
2050

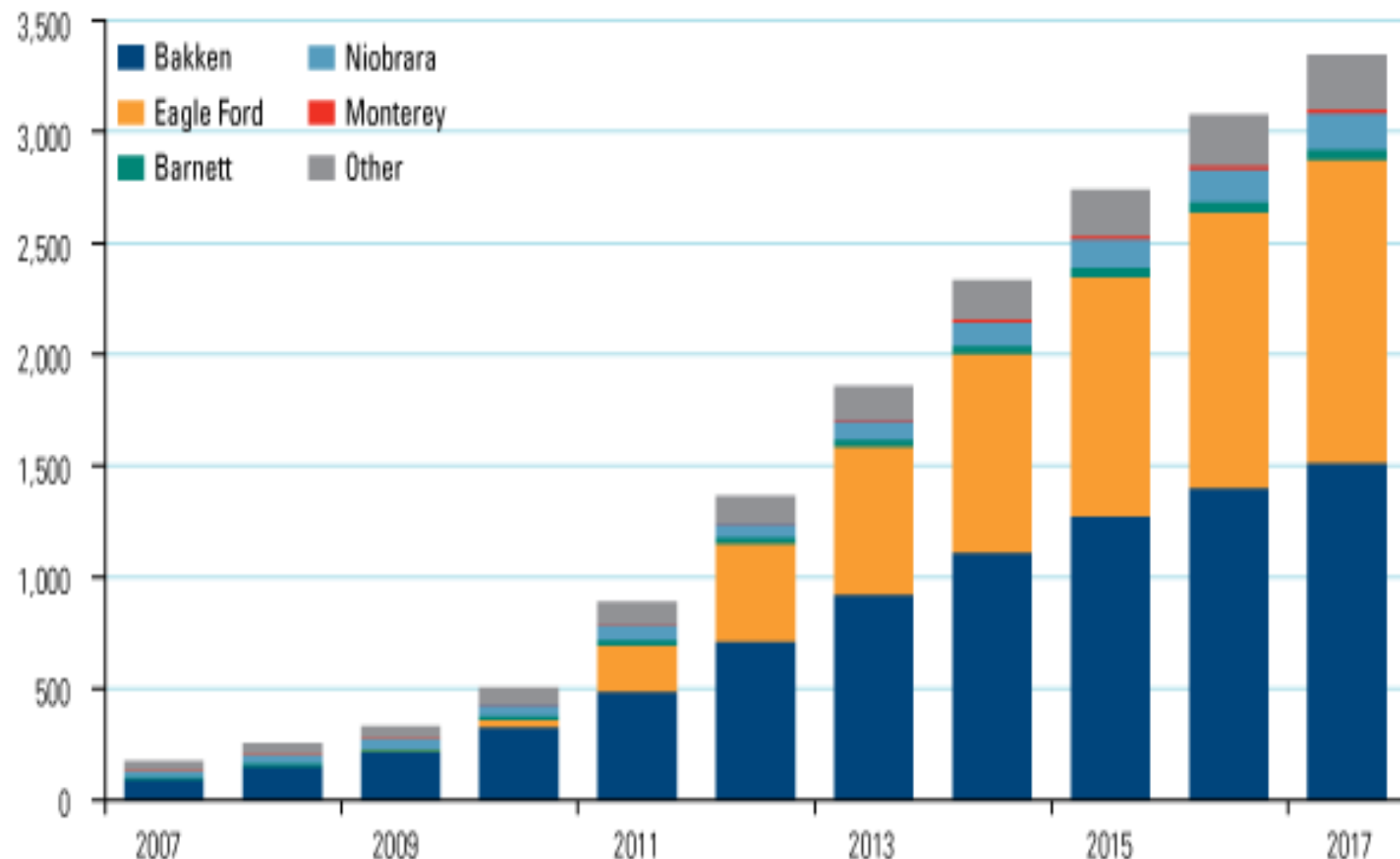
WATER

40%

INCREASED DEMAND BY
2050

U.S. Shale Oil Production Growing

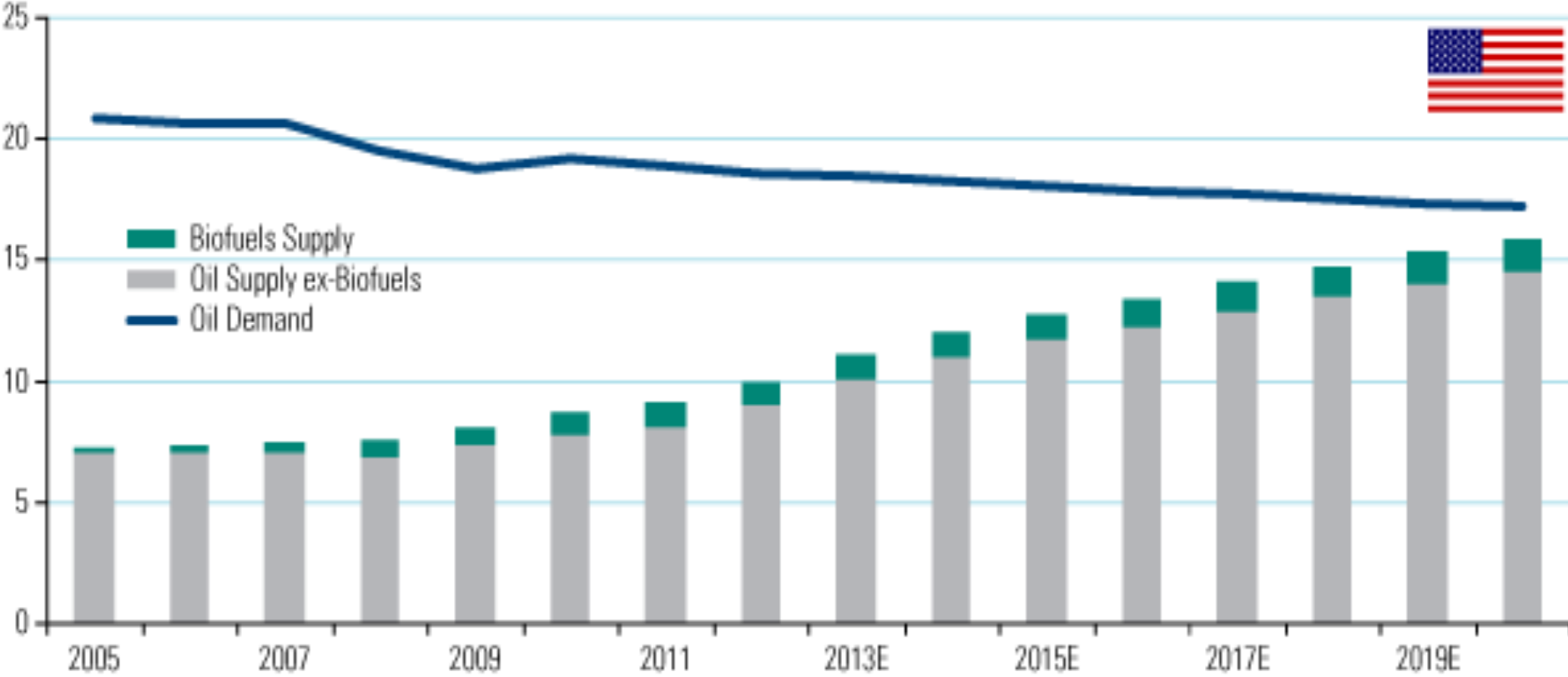
Thousand barrels per day



Source: Woodmac, IEA, EIA, Reuters, company reports, BofA Merrill Lynch Global Commodities Research

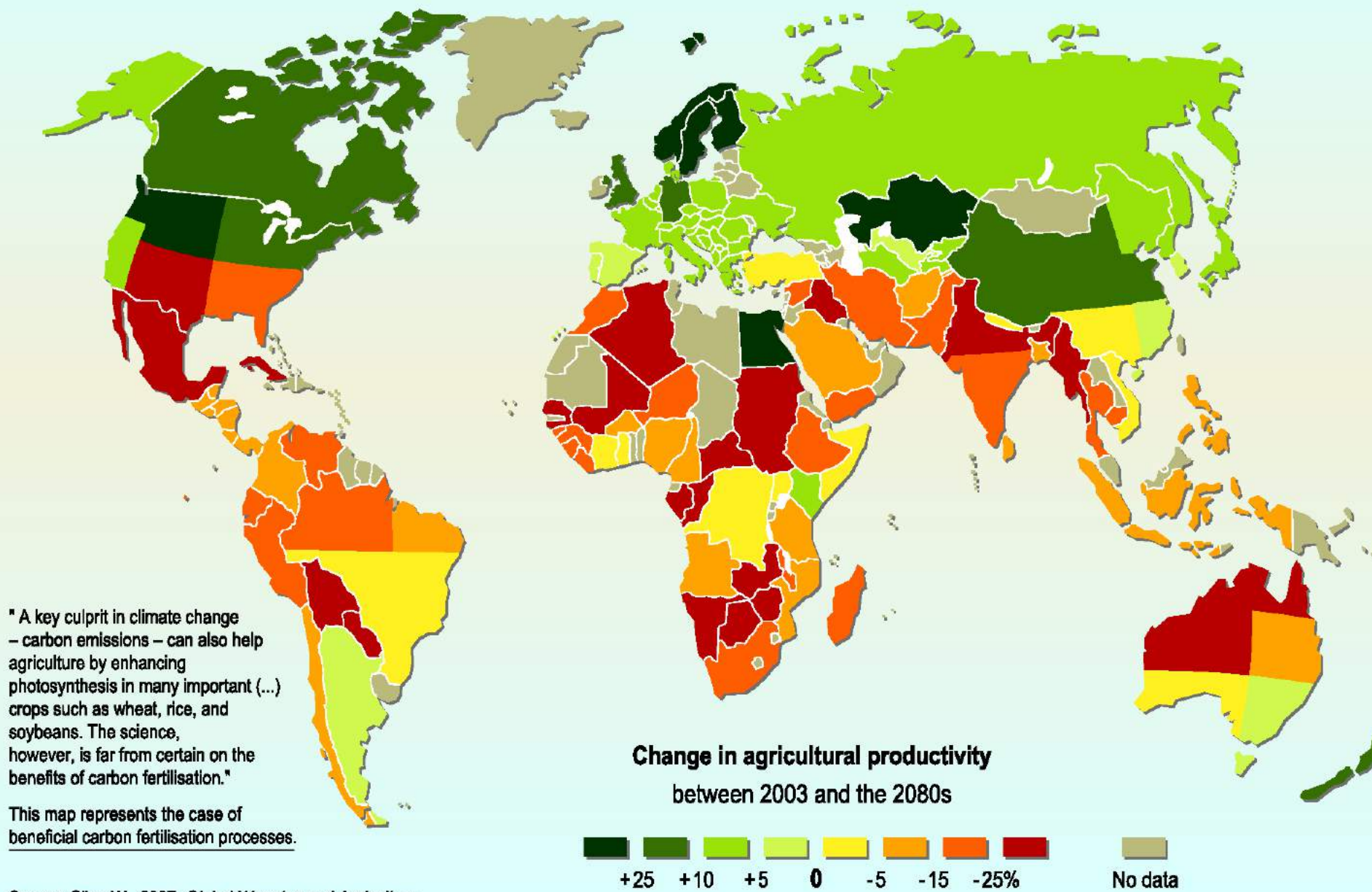
Oil in the U.S.: Rising Supply and Declining Demand

Million barrels per day



Source: EIA, IEA, Raymond James estimates

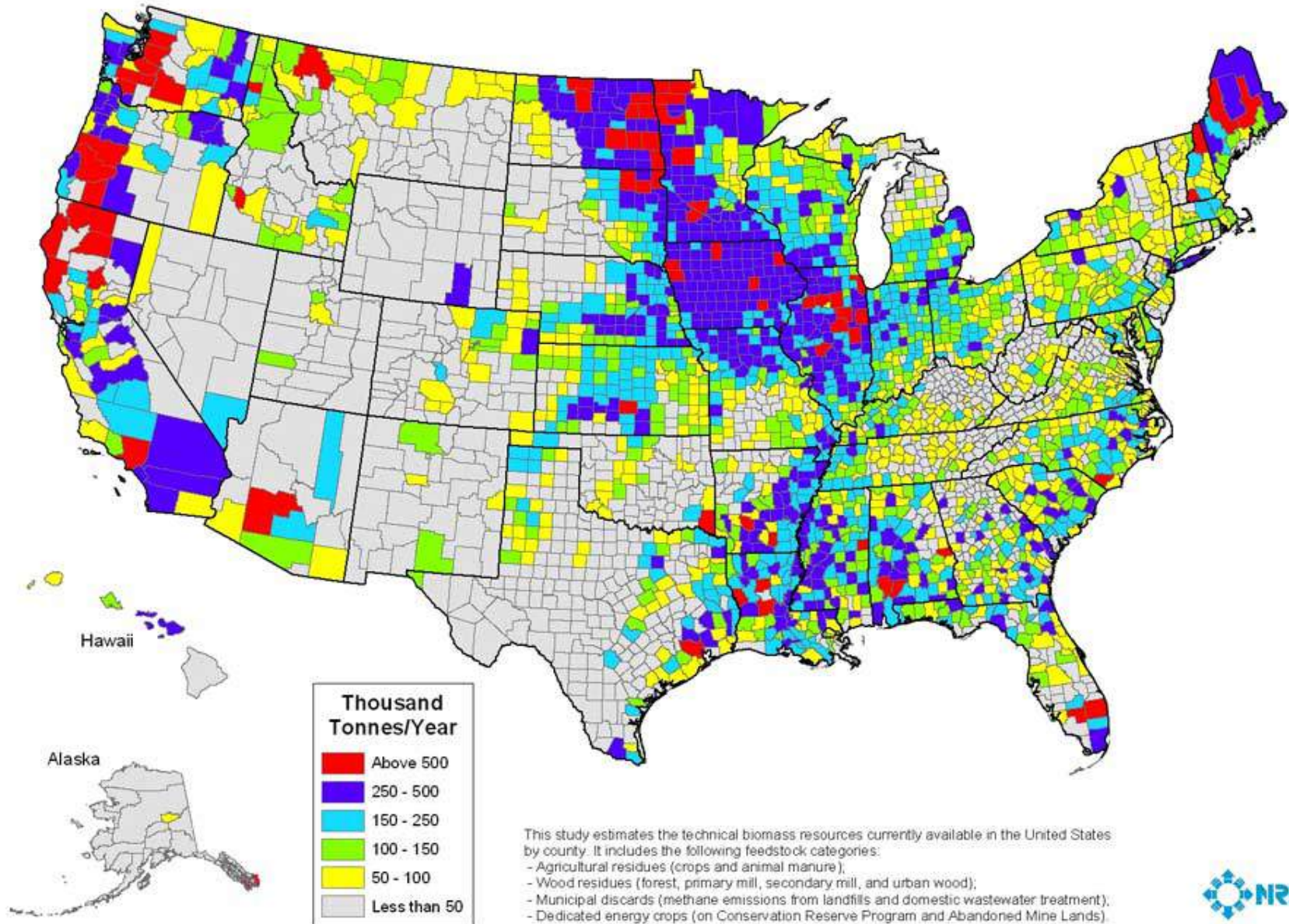
Projected impact of climate change on agricultural yields



" A key culprit in climate change – carbon emissions – can also help agriculture by enhancing photosynthesis in many important (...) crops such as wheat, rice, and soybeans. The science, however, is far from certain on the benefits of carbon fertilisation."

This map represents the case of beneficial carbon fertilisation processes.

Biomass Resources Available in the United States

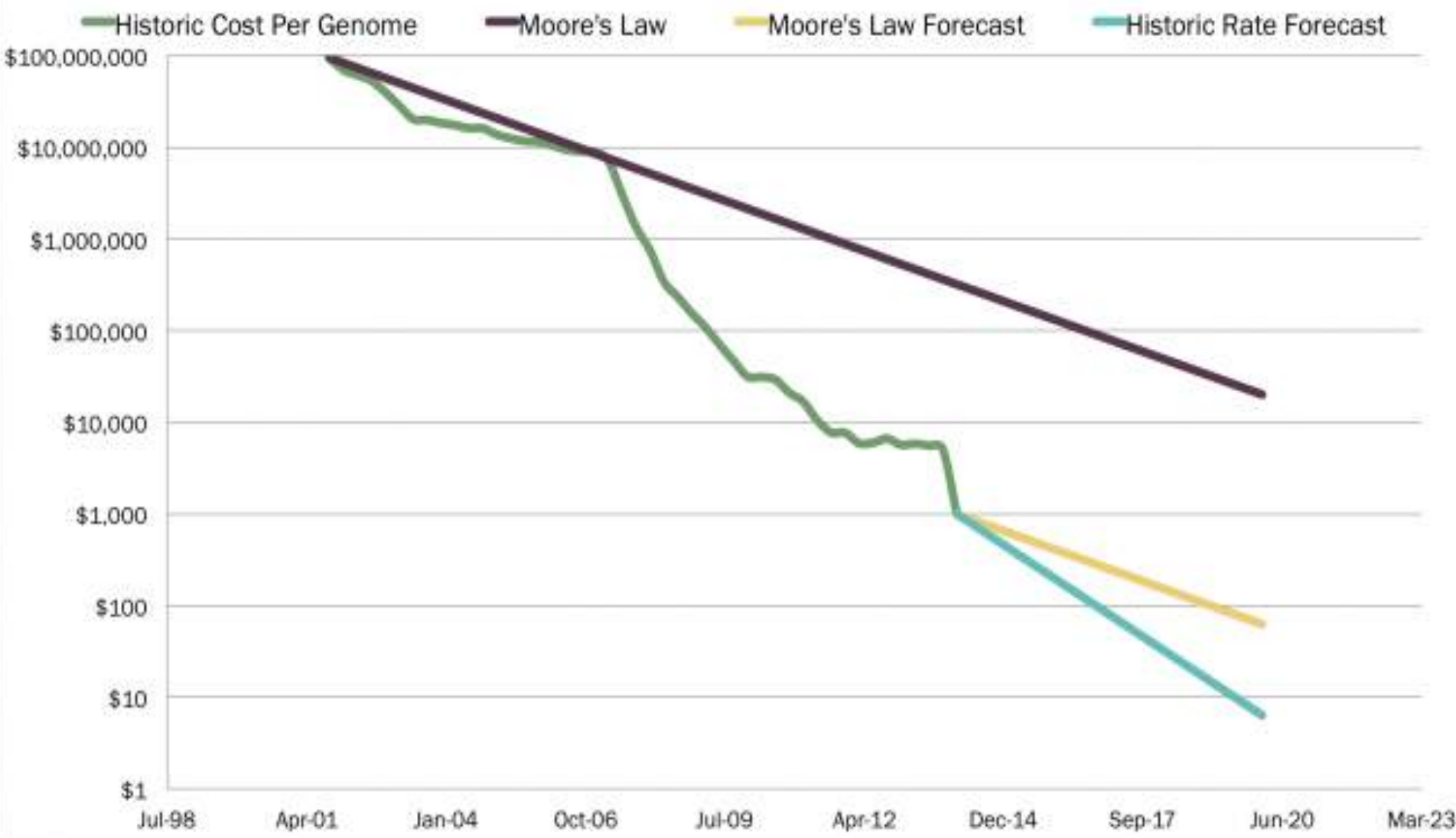


Technology – driving and enabling accelerated change; Impact on Workforce

Technology – a catalyst for change



Cost Declines of Genome Sequencing



Industrial 'Internet of things'



Factory Performance

- Maintenance
- Production Timing and Changeover

Connected Machines & People



Logistics Optimization

- Real Time Network Planning
- Shipment Visibility
- Security



Product Performance

- Quality Assurance
- Future Design Improvements

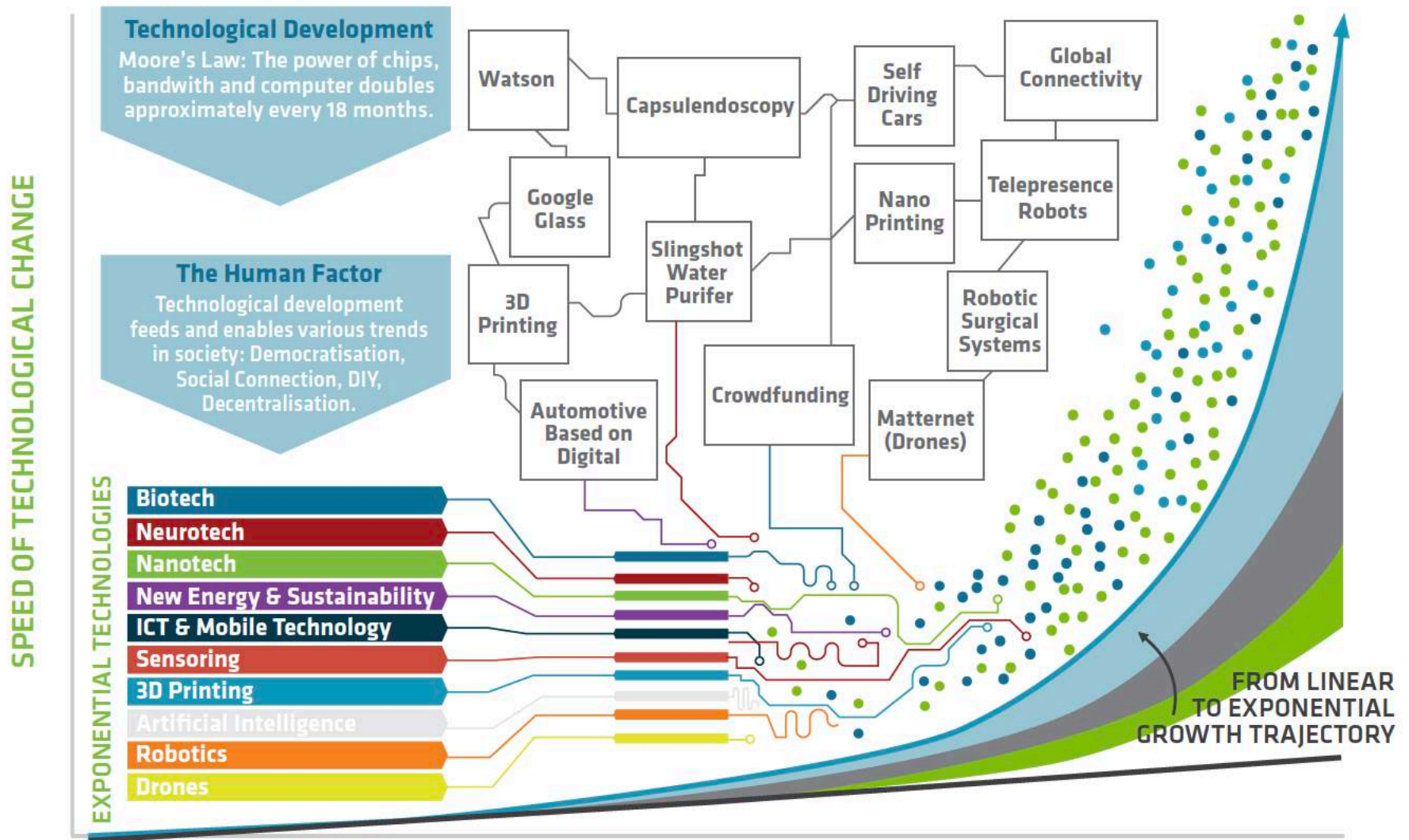


Energy Use Optimization

- Smart Grid

By 2020 – between 25 and 100 billion things will be connected to the internet

*Foresight. The Future of Manufacturing: A new era of opportunity and challenge for the UK.
The Government Office for Science, London, 2013.*



Source: Deloitte. 2014. Industry 4.0 Challenges and solutions for the digital transformation and use of exponential technologies.

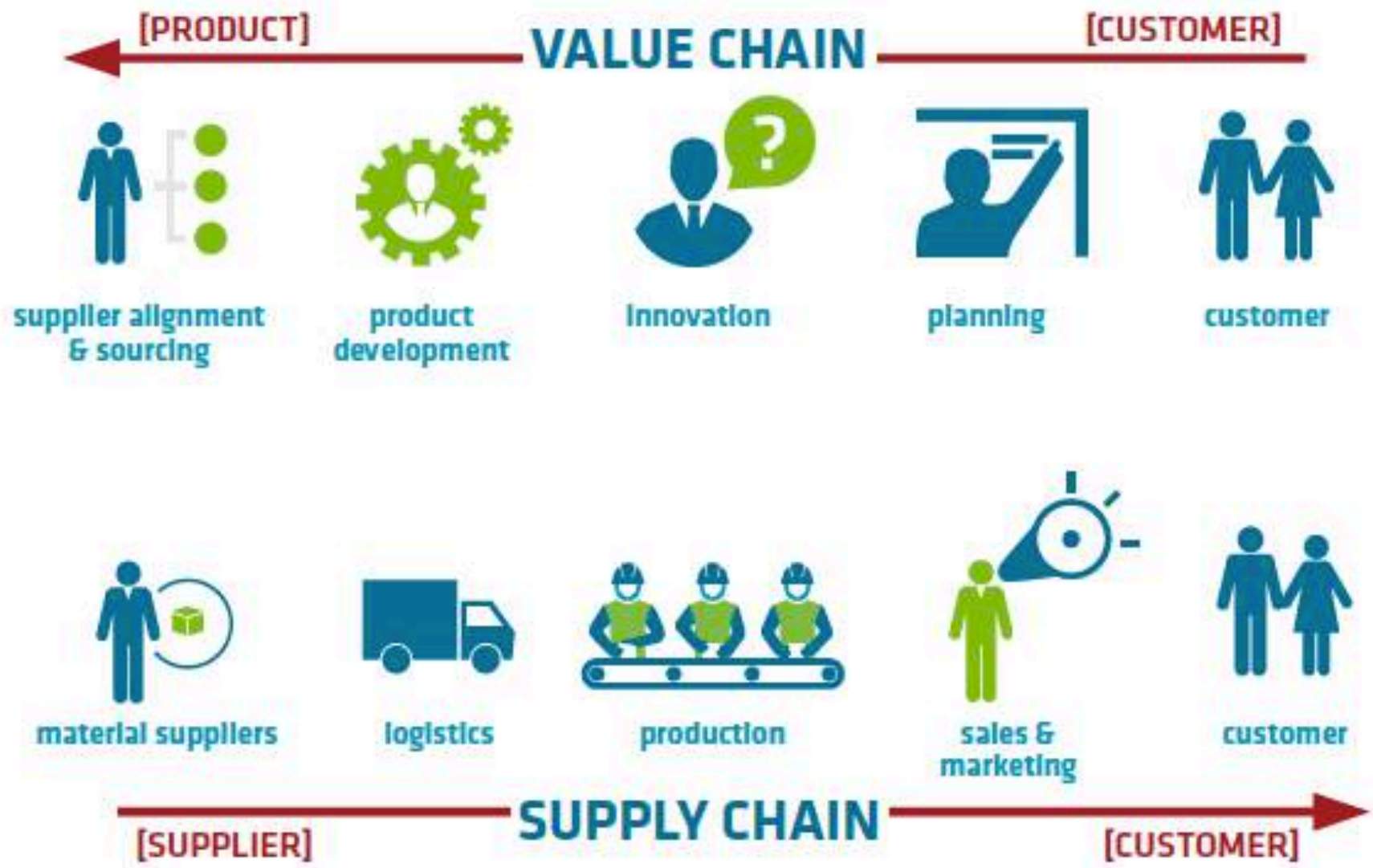
Innovation diffusion



“Introducing breakthrough technologies benefits greatly from coordination among firms, including suppliers that can improvise, do new things, and understand the whole as full partners in innovation.”

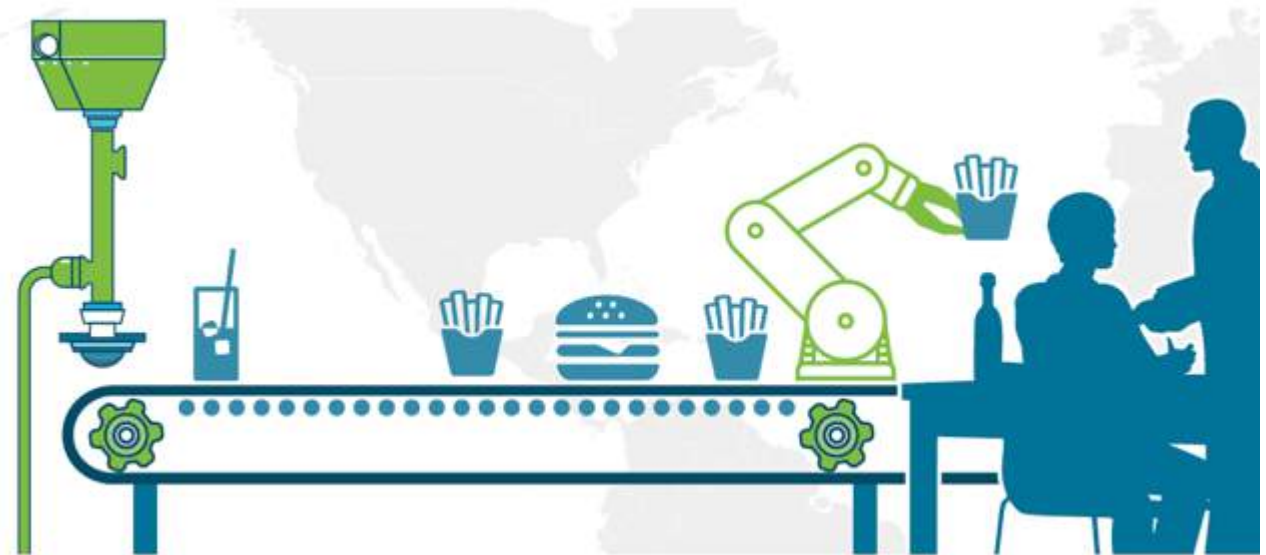
Secretary Penny Pritzler, U.S. Department of Commerce, March 2015.

Moving from supply to value chains

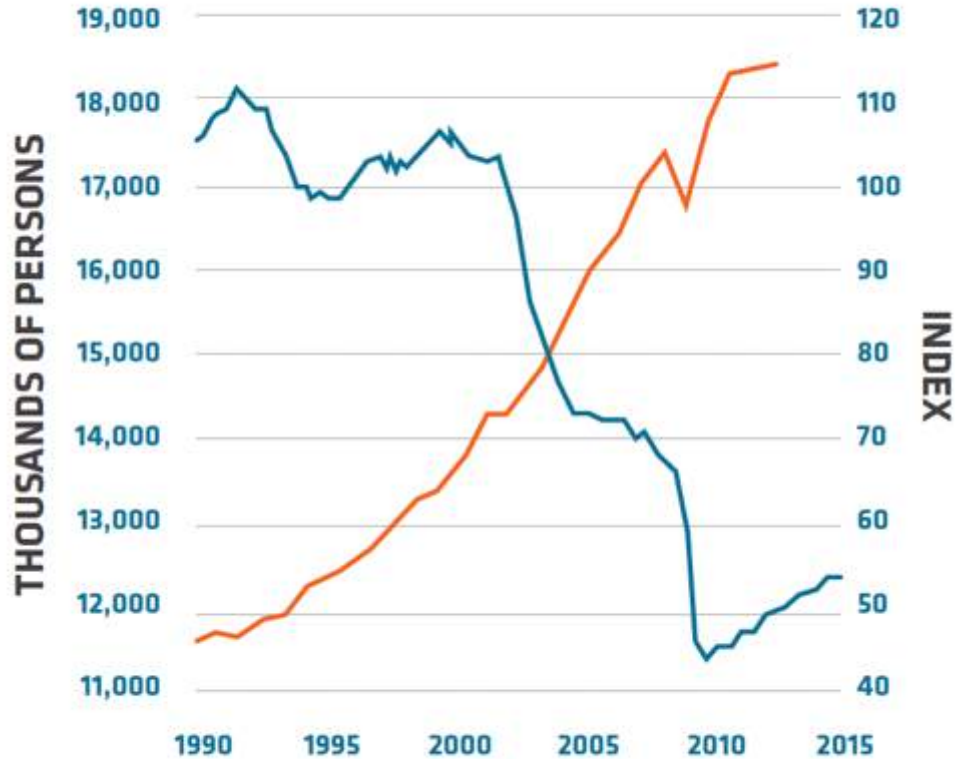


Preparing for the Next Industrial Revolution

Advanced Manufacturing, Robotics and Life Sciences

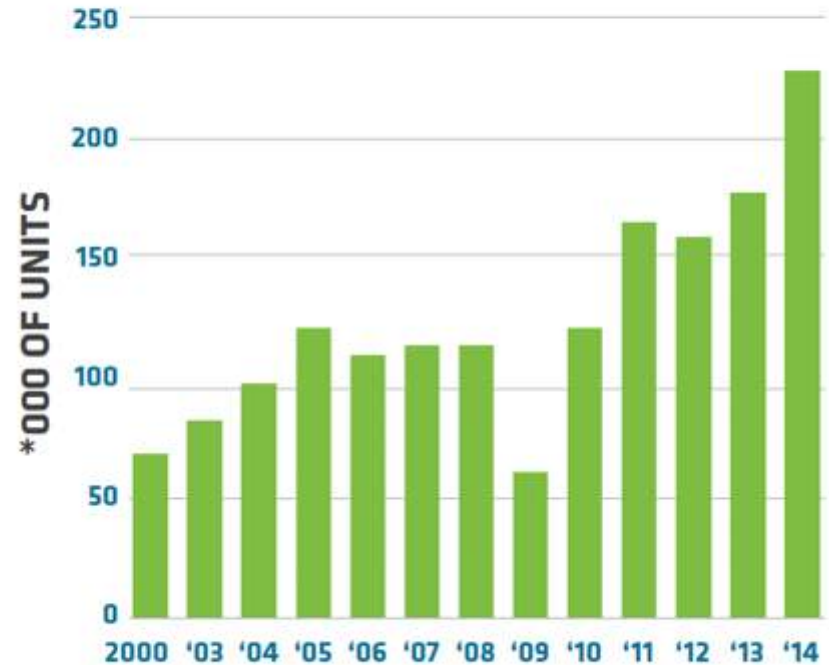


■ ALL EMPLOYEES: MANUFACTURING (LEFT)
■ MANUFACTURING: OUTPUT PER HOUR OF ALL PERSONS, 2007 = 100 (RIGHT)



Source: FRED Economic Data. 2015. Economic Research, Federal Reserve Bank of St. Louis.

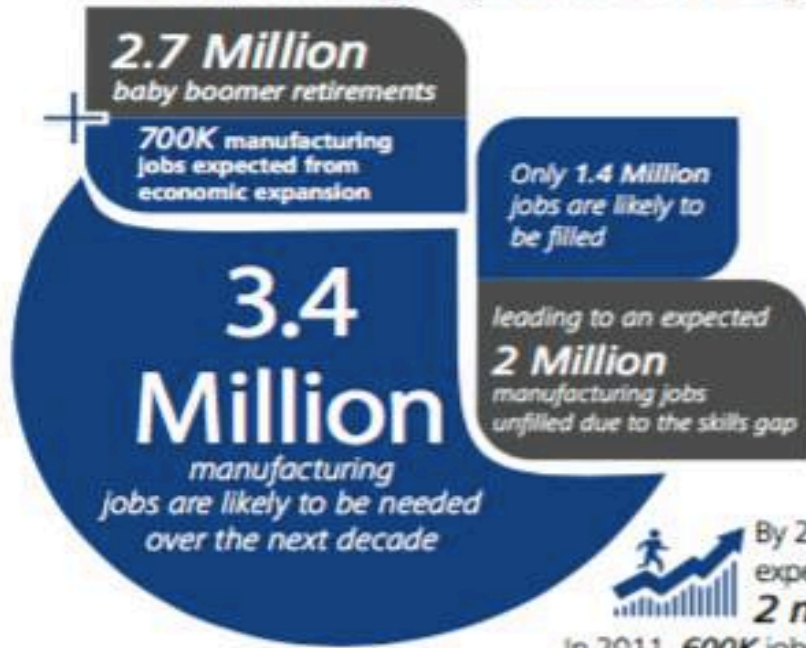
ESTIMATED WORLDWIDE ANNUAL SUPPLY OF INDUSTRIAL ROBOTS




Source: International Federation of Robotics. 2015.

Regional Workforce Needs Analysis

2015 **2 Million** 2025
are expected to go unfilled due to the skill gap



 By 2025 the skills gap is expected to grow to **2 million**
In 2011, **600K** jobs were unfilled due to the skills gap

Skills in which manufacturing employees are most deficient

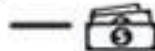
 **70%**
technology/
computer skills

 **69%**
problem
solving skills

 **67%**
basic technical
training

 **60%**
math skills

In developed countries, the average wages for mid-skilled manufacturing workers in STEM fields have increased by 42 % compared to 8 % growth for all manufacturing workers.

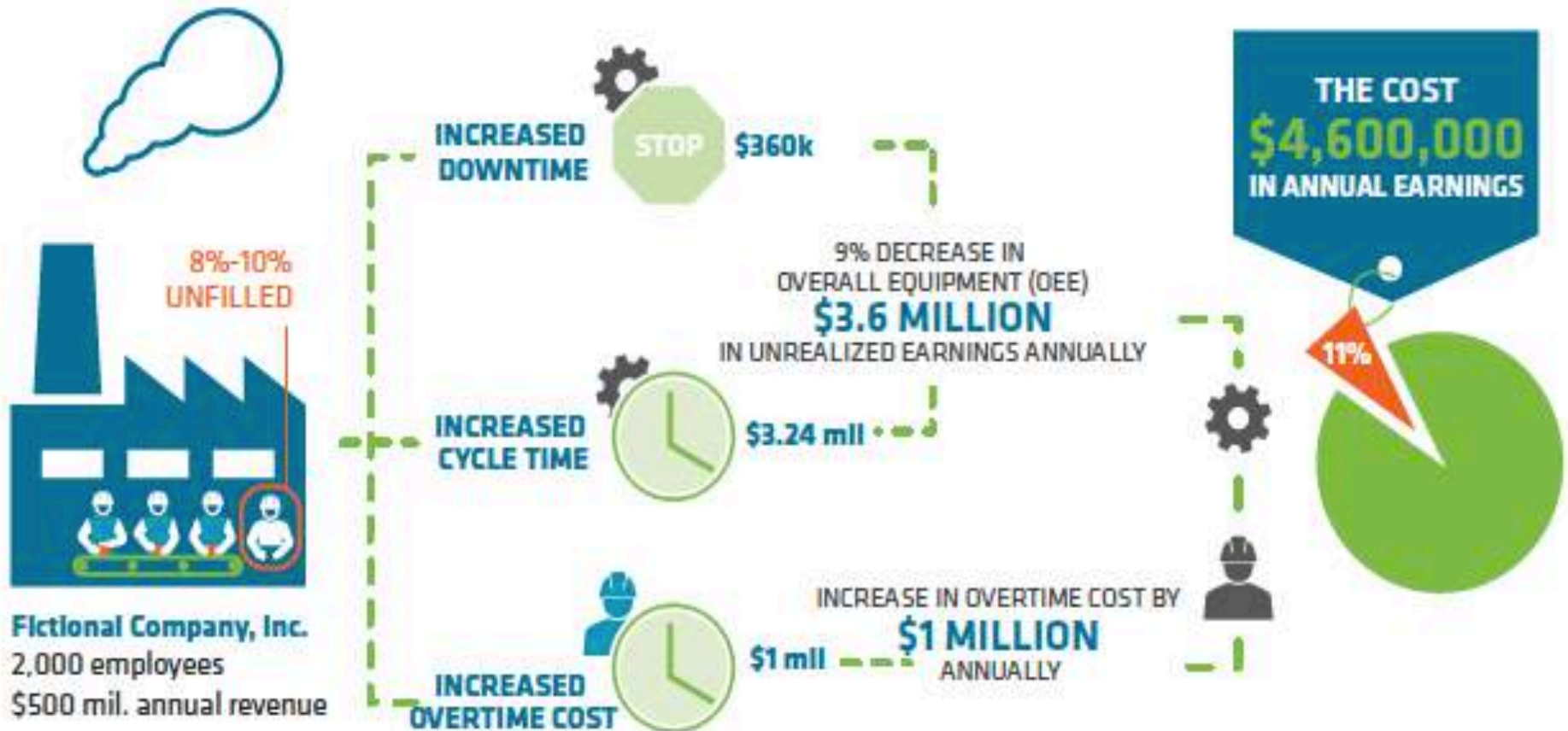


A single manufacturing-based knowledge worker contributes as much as nine times the value added of a single production worker.



Manufacturing careers that require some form of post-secondary education are expected to grow by 35 percent over the next decade.

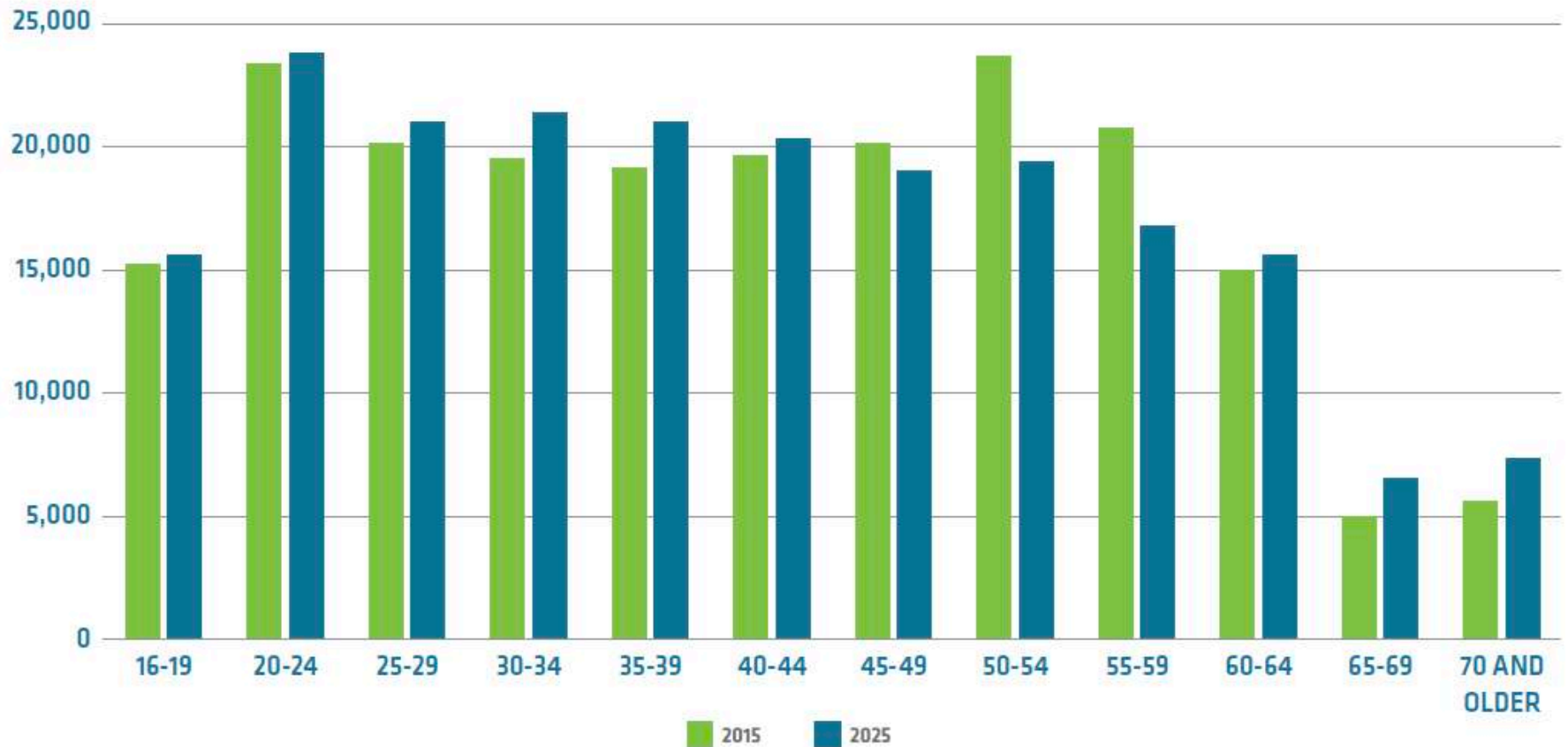
Cost of labor shortage



Source: Accenture, and Manufacturing Institute. 2014. Accenture 2014 manufacturing skills and training study.

Regional Workforce Needs Analysis

Greater Lima Region - Available Labor Force Composition by Age Cohort - 2015 and 2025



**based on medium regional growth scenario*

Areas of profound change...

What does all this mean for the New North Region?



future→iQ

Create Future Intelligence™