

# The Next Big Thing in NRM?

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[www.csiro.au](http://www.csiro.au)



***Prediction is very difficult,  
especially if it's about the future!***

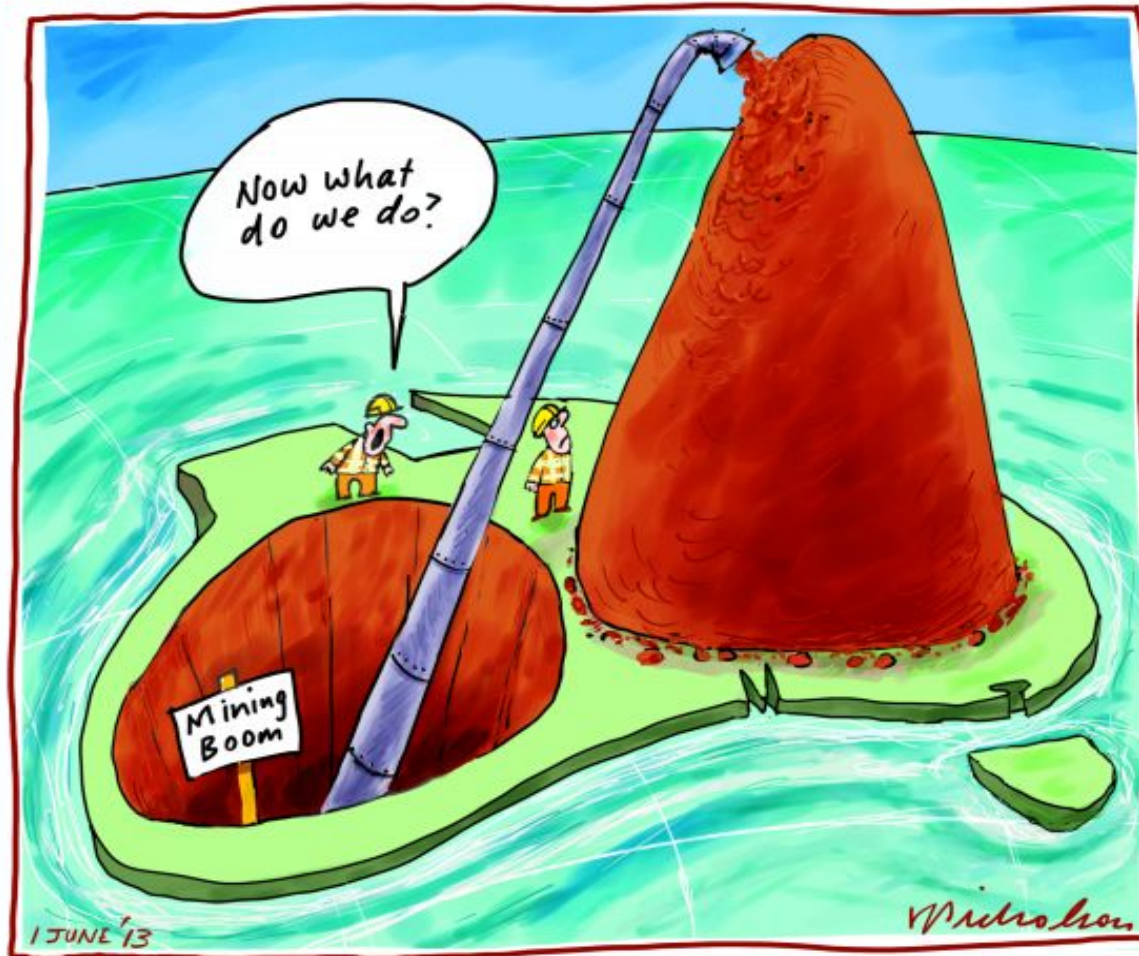
**Niels Bohr  
Nobel Prize in Physics 1922**

# A changing world.....



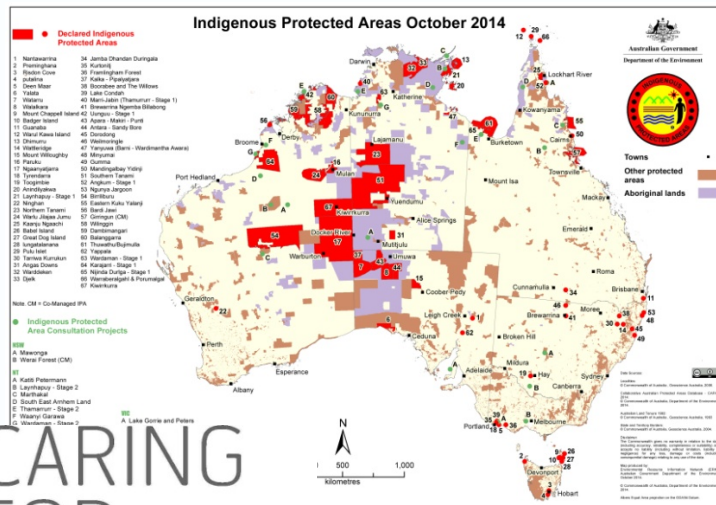
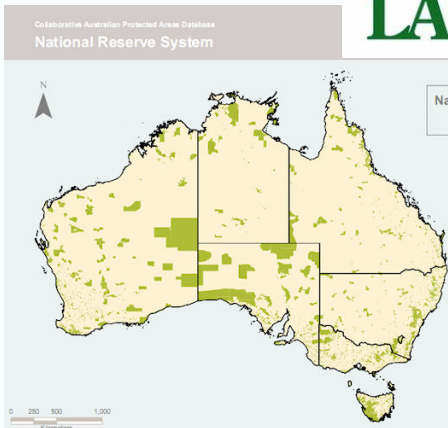
Source: Reuters

# Plan B for Australia??????



Source: Nicholson Cartoons, 2013

# Fruits of consensus.....



CARING FOR OUR COUNTRY

NATURAL RESOURCE MANAGEMENT REGIONS  
Australia

Source: Australian Government





# Flash in the pan????



Source: The Whitehouse, 2015

# Complex transformations.....



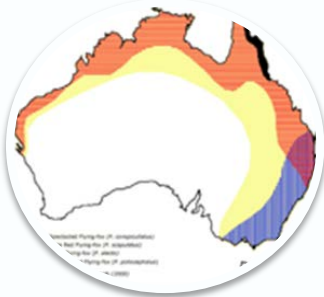
Source: AFP



# Digital revolution and NRM....



Measuring and monitoring the environment



Evaluating environmental performance



Organizing and influencing decision making

# Power to the people.....



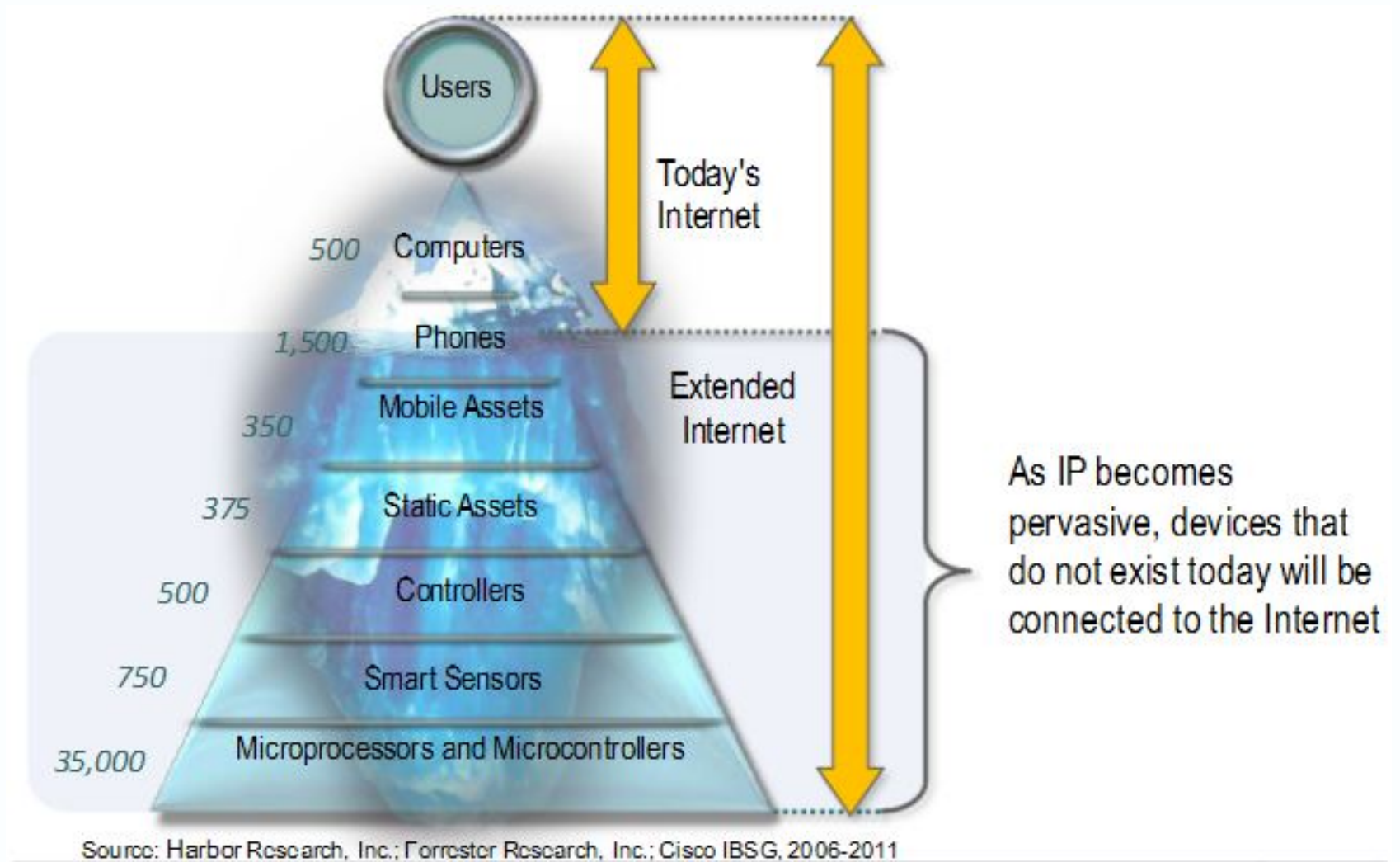
Source: The Economist, 2015

# The next frontier: mm-nano scale sensing....



Source: Tim Wark, CSIRO

# The “Internet of Things” .....

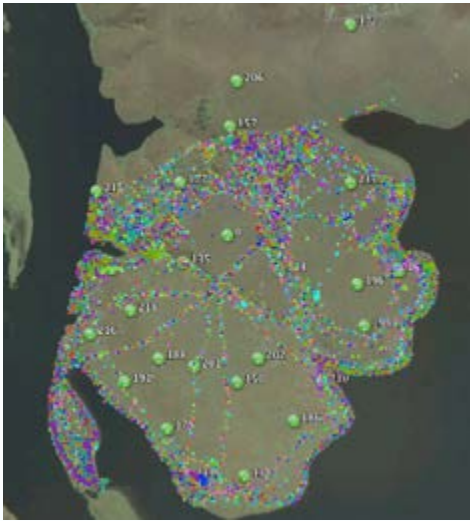


# Digital data and citizen science....

The screenshot shows the Atlas of Living Australia website. At the top, there's a navigation bar with the logo 'ATLAS of LIVING AUSTRALIA sharing biodiversity knowledge' and a search bar. Below the search bar, there's a large image of a bird. To the right, there's a sidebar with the text 'Sharing biodiversity knowledge' and a map of Australia. The main content area is divided into several sections: 'Explore' with sub-sections like 'Australia's species', 'Species by location', 'Natural history collections', 'Mapping & analysis', 'Data sets', and 'Partner Profiles'. There's also a 'Get involved' button and a 'Blogs & news' section with a recent post about 'Australia's Virtual Herbarium: 5 million records and counting'. At the bottom, there's a footer with navigation links like 'Contact us', 'Partners', 'Communications', 'About the Atlas', 'Citizen science', and 'Help'. The browser's taskbar is visible at the very bottom.

Source: www.ala.org.au

# Sensors and sensor networks.....



Deploy unobtrusive sensors and actuators on and inside livestock and in the farm environment

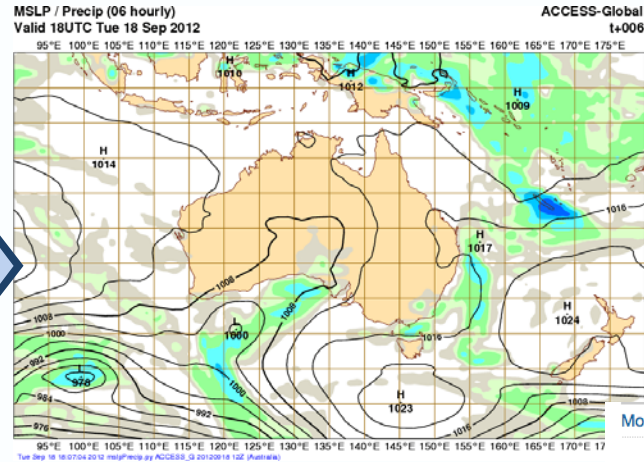
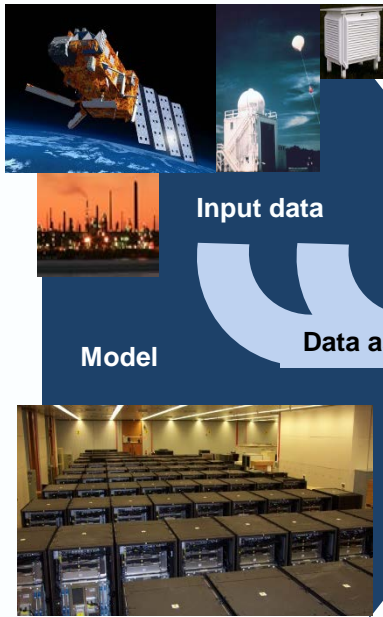


Measure position, context, food intake, and behavior of farm animals and correlate these with environmental factors

Source: Tim Wark, CSIRO



# Big data in action..... weather forecasting



Monday 15 October

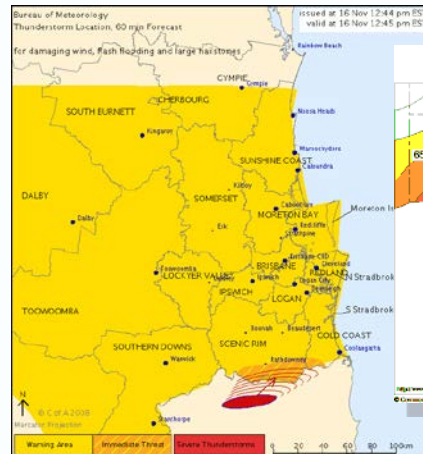
Min 2 Max 23  
Mostly sunny.

Chance of any rain: 10% ■■■■■■■■

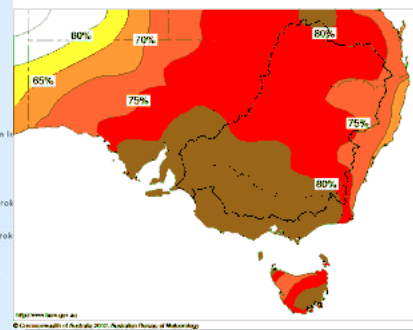
Rainfall amount: 0 mm

Fire Danger - Low-Moderate

UV Alert from 9:20 am to 4:10 pm, UV Index pre



Chance of exceeding the median Max Temp October to December 2012  
Product of the National Climate Centre



Tuesday 16 October

Min 8 Max 25  
Partly cloudy.

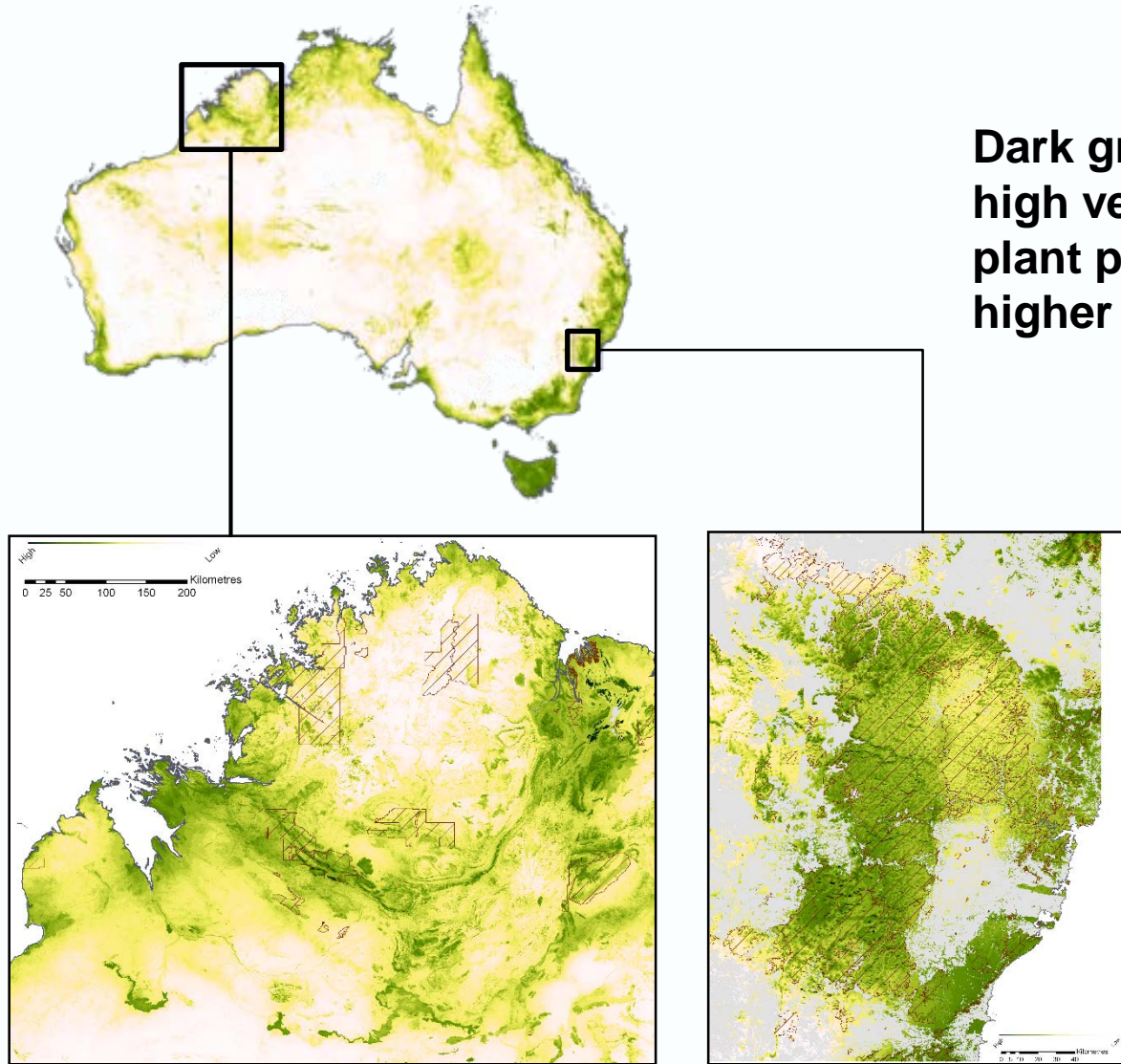
Wednesday 17 October

Min 7 Max 21  
Mostly sunny.

Source: Bureau of Meteorology, 2013



# Big data in action..... species persistence



Dark green shows areas of high vertebrate and vascular plant persistence under higher temperatures

Source: Sheppard, A., Ferrier, S., and Cowardine J., CSIRO, 2014

# A world of difference.....

## Old Power Values

Managerialism, institutionalism, representative governance

Exclusivity, competition, authority, resource consolidation

Discretion, confidentiality, separation between private and public spheres

Professionalism, specialisation

Long-term affiliation and loyalty, less overall participation

## New Power Values

Informal, opt-in decision making: self-organisation; networked governance

Open source collaboration, crowd wisdom, sharing

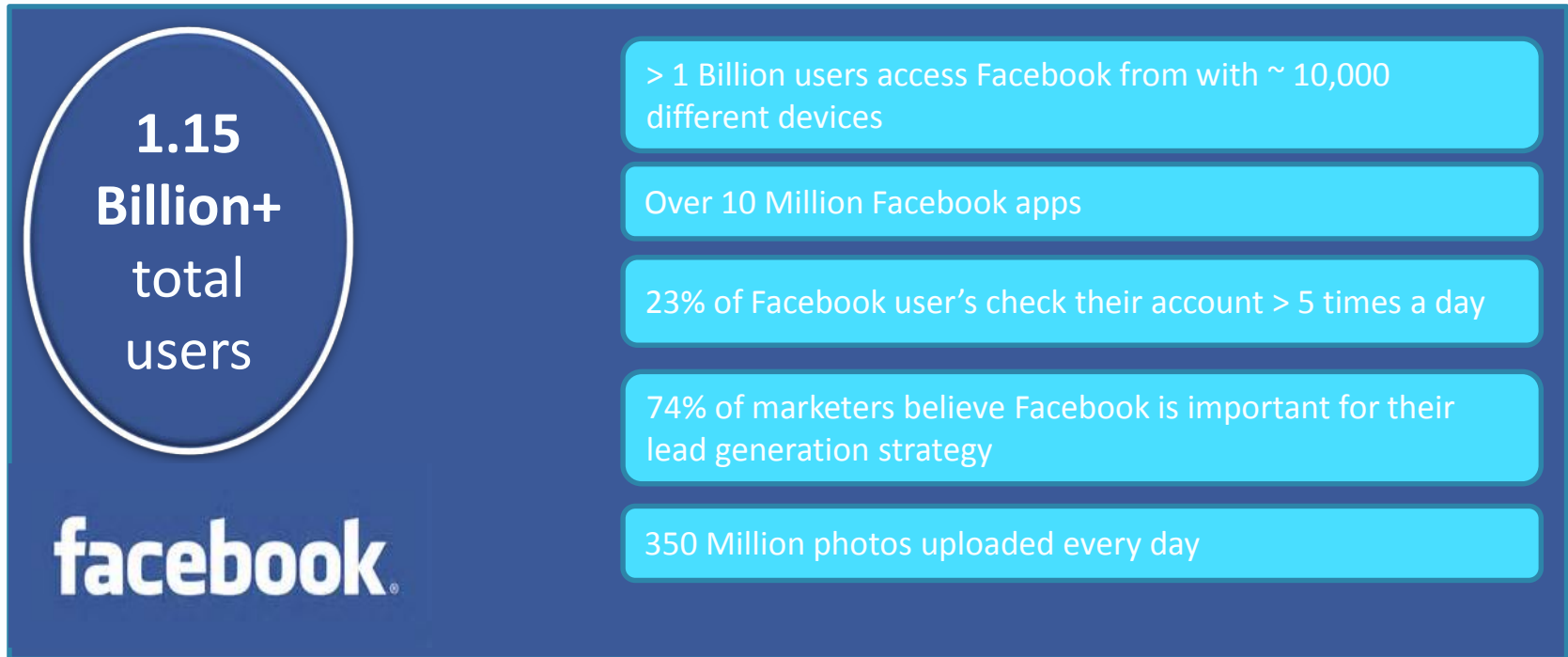
Radical transparency

Do-it-ourselves, “maker culture”

Short-term, conditional affiliation; more overall participation

Source: Heimans, J. & Timms H. Harvard Business Review 2014

# New media.....a new frontier.....



Source: [www.digitalbuzzblog.com](http://www.digitalbuzzblog.com)

# Public participation 2.0....

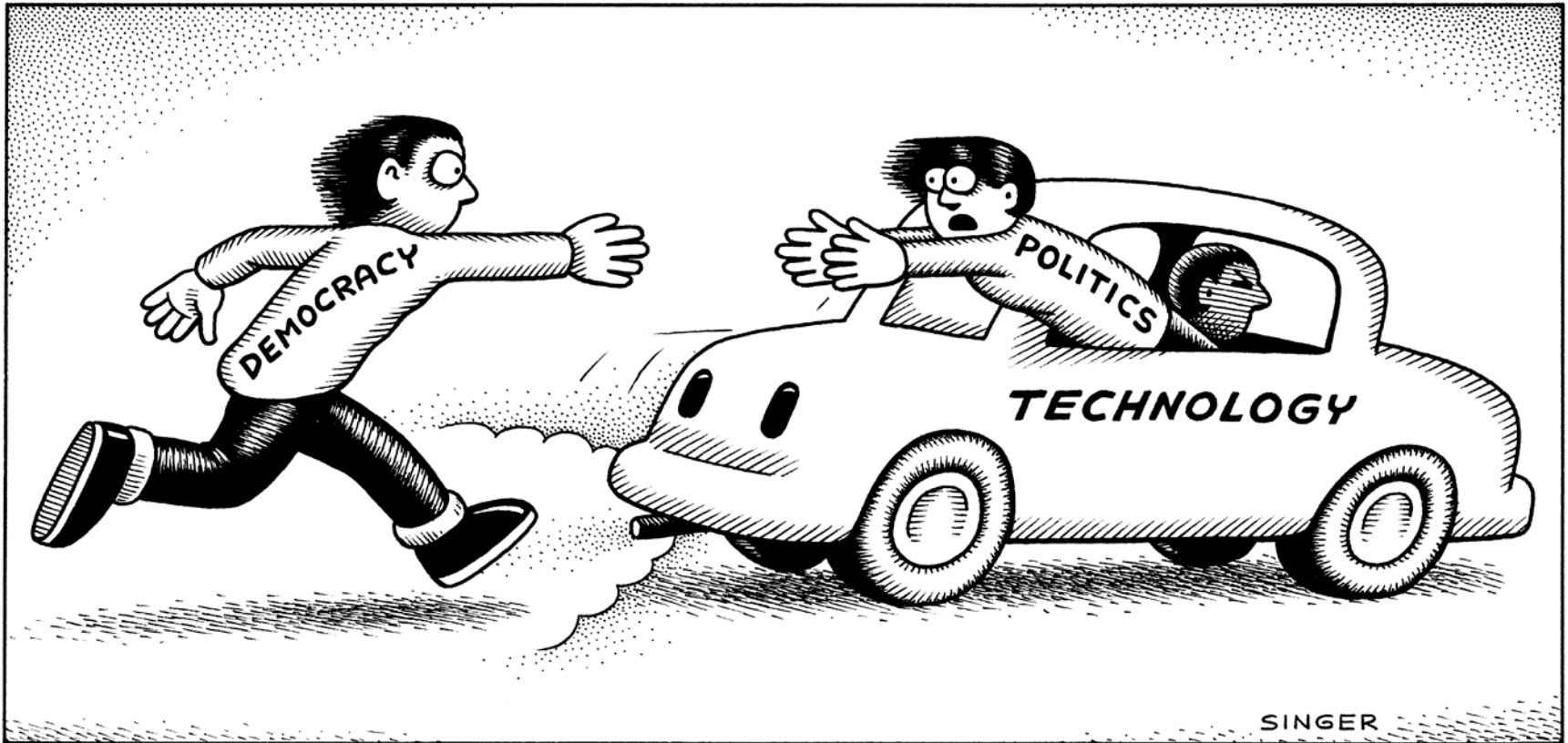


Source: Brad Moore, Wordpress.com, 2014

# ....not all beer and skittles.....

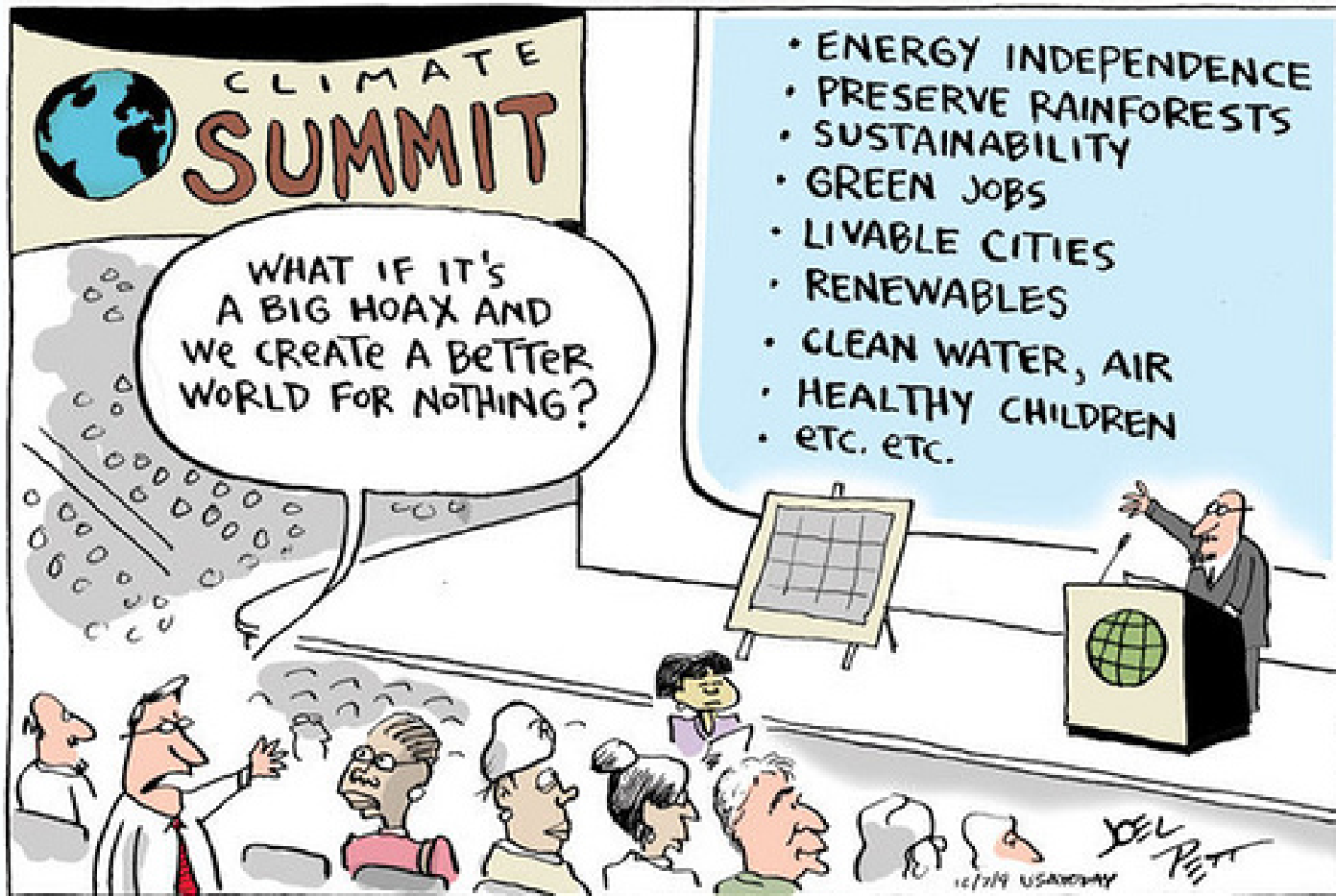
**NO EXIT**

© Andy Singer



Source: politicalcartoons.com, 2005

# Big conversations.....critical choices....



Source: USA Today, 2012