

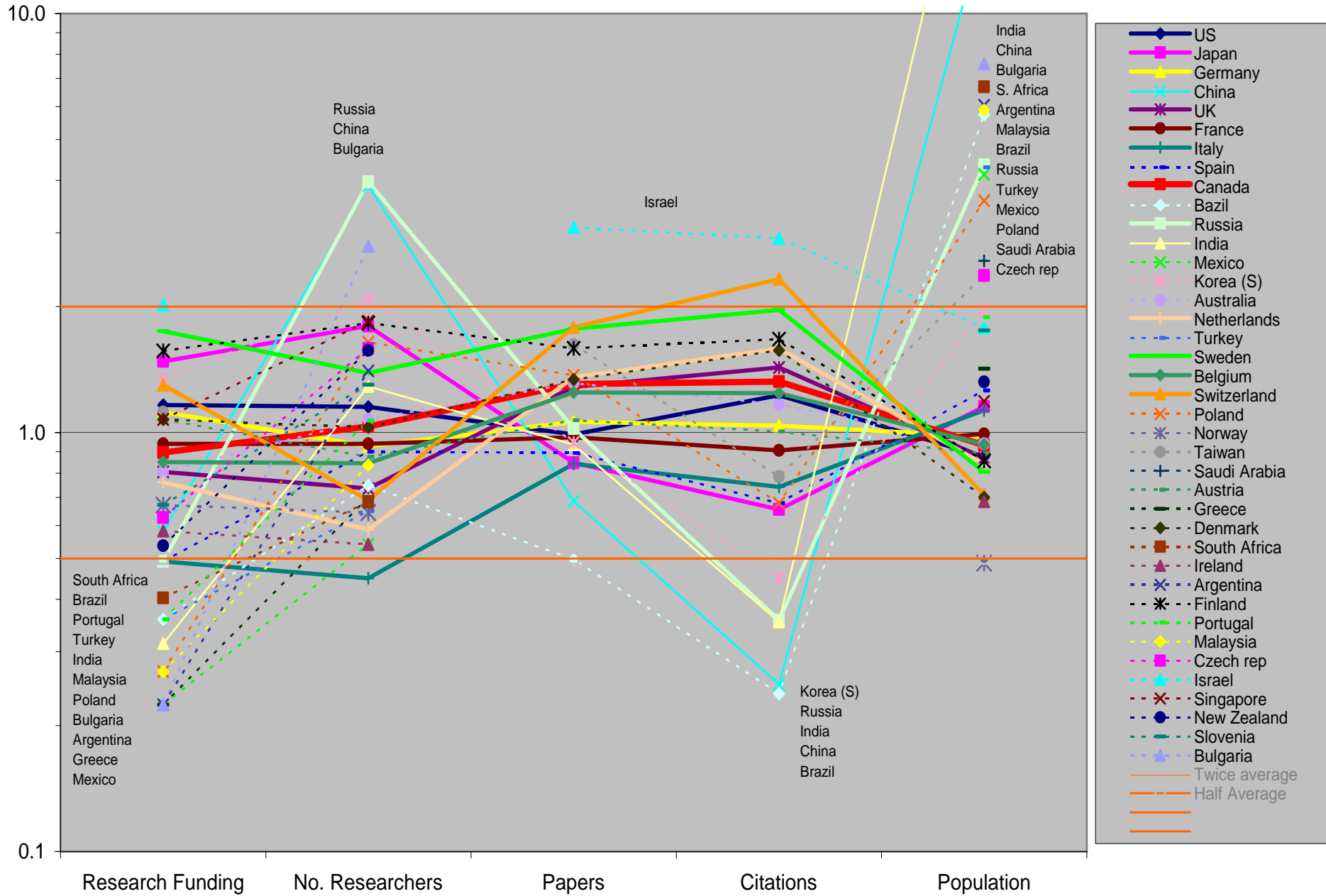
- HPC in Canada
- Simulations of CMB weak lensing

ClfAR Cosmology & Gravitation, Feb 2010
Hugh Couchman, McMaster

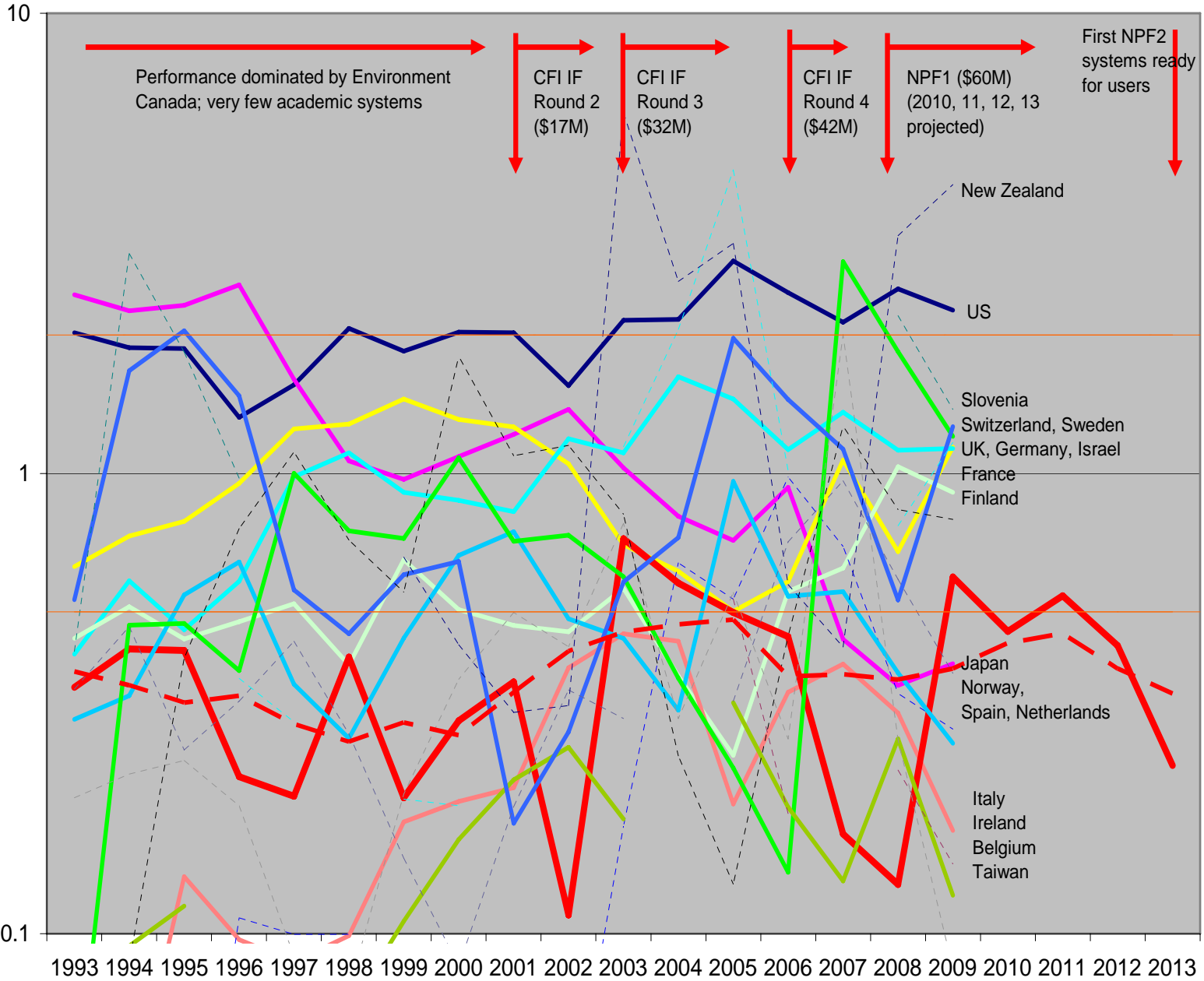
HPC in Canada

- The importance of HPC to various specific disciplines is *relatively* easy to argue (although, to be honest, the arguments are received with variable success)
- It is much more challenging to argue **how much** is needed, or the **funding rate** required, when needs must be aggregated across all disciplines and levels of skill/need across the country
 - “*We’ve just funded \$120M, that should be plenty*”

Research activity relative to GDP by country



HPC relative to GDP by country (ordered by GDP)



- US
- Japan
- Germany
- UK
- France
- Italy
- - - Spain
- Canada
- Netherlands
- Sweden
- Belgium
- Switzerland
- - - Norway
- - - Taiwan
- - - Ireland
- - - Finland
- - - Israel
- - - New Zealand
- - - Slovenia
- Twice Average
- Half Average
- - - Cdn 5yr av.

New Zealand

US

Slovenia

Switzerland, Sweden

UK, Germany, Israel

France

Finland

Japan

Norway, Spain, Netherlands

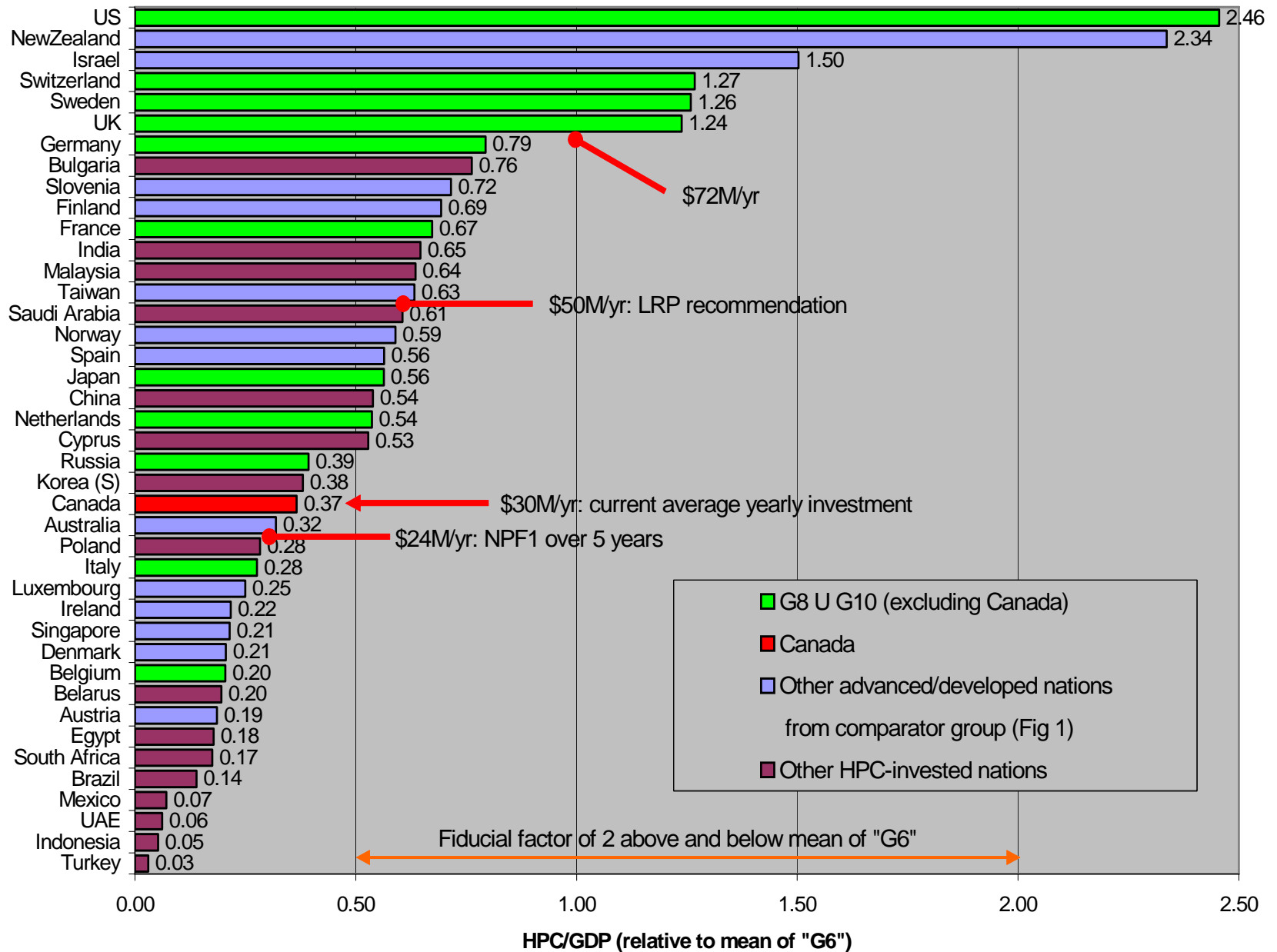
Italy

Ireland

Belgium

Taiwan

HPC/GDP (2005-2009 average)



Conclusions

- Cannot take availability of comprehensive HPC infrastructure for granted
- These costs are for equipment and do not include operations (primarily power) or people; in most competitive jurisdictions these increase costs by 70-100%
- Critical strategic importance for Canadian competitiveness is not clearly understood by funding agencies or governments
- Concentration of resources into Compute Canada and the increasing difficulty of obtaining HPC outside CC (& the 7 “HPC consortia”) has created a single point of failure.
- Canadian astronomy is vulnerable both from the standpoint of modelling/simulation but particularly because of need to respond to data processing demands of current & upcoming experiments/observations