A sustainability angle to theory and formal methods?

Thanks for input from Matthew Parkinson, Larry Paulson, Andy Pitts and Peter Sewell

- From the School of Technology 5-year plan

  "... need appropriate computational notions of key concepts like space and time that are different from those used in other fields like physics."

  - can new CS theory provide new "key concepts"?

- Must reduce CO_2 output ... nuclear power is one solution
  - reactor verification already a target for formal methods

- Environmental modelling is computationally expensive
  - could new algorithms speed up weather prediction?

- Conserving resources
  - new theory for low power (want models and algorithms)

Reducing waste

- Better tools save time and improve quality of life
  - millions of hours wasted by people using poor languages
  - ML/Haskell 10$\times$ more productive than traditional languages (and better code)
- Energy costs of bad languages might be substantial
  - millions of PCs running tests and recompilations
- Verification may be needed for energy saving technologies
  - safety of Greaves style home automation
  - car and aircraft electronics
- Reliability achieved at expense of sustainability
  - can extra computation be avoided by better static checks (e.g. advanced typechecking to avoid runtime code)
  - can equipment be eliminated by better security verification (e.g. eliminate need for physically separated hardware)

Worries ...

The goals defined in AH's email are:

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1 To define what "Computing for Sustainability"
  or "Computing for the Future of the Planet"
  means in each CL research area.

2 To co-ordinate the CL perspectives on these topics.

3 To stimulate research to make sure the CL is ahead
  as this becomes an important driver for computing.

4 Possibly to sketch out some projects and identify
  potential funding sources.
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Can we really identify a sustainability angle for the areas of Theory, Semantics and Automated Reasoning?

- it was hard work to come up with the preceding ideas (I can't help feeling the whole idea is a bit bogus)
- "sustainability" may raise money – but is this honest?