Propertization, Dissemination and Innovation: Intellectual Property and Clean Technology in the Developing World

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Background

- UN Framework Convention for Climate Change (UNFCCC)
- Bali Road Map (Dec. 2007)
  - Calls for action on Clean Technology development and transfer in the developing world
- International discussions of IP have been:
  - Emotional
  - Politicized
  - Monolithic
Building Blocks

• **Dissemination**
  – Bringing CleanTech to Developing Countries (Tier 3)
    • Importation of products/services
    • Transfer of knowledge
  – A global need

• **Innovation**
  – Developing new CleanTech and improving existing CleanTech
    • Centered today in Tier 1/2 countries
    • Needed to most effectively utilize CT in Tier 3
    • Potential benefits of Tier 3 innovators

• **Propertization**
  – Does IP foster or hinder CT Dissemination and Innovation in the developing world?
    • Patent v. compulsory licensing
Propertization and the Essential Medicines Debate

• Background
  – Diseases such as AIDS, TB, Malaria at epidemic levels in Developing World
  – Medications offered by Western pharmaceutical vendors are too expensive for most of the populace

• Assertions
  – *Patents* that give Western pharma exclusivity to sell essential medicines are inhibiting the fight against disease
  – Eliminate the patents $\rightarrow$ eliminate the problem
  – This dialog has shaped the discussion around CT
Essential Medicines: Result

• WTO TRIPS Agreement (1995)
  – Imposes patent requirements on all signatories
  – Art. 30 – permits limited exceptions to exclusive rights w/o “unreasonable prejudice” to patent owner
  – Art. 31 – compulsory licensing permitted after unsuccessful attempt to secure rights on reasonable commercial terms, primarily for *domestic* market

• Doha Declaration (2001)
  – Confirms that TRIPS allows promotion of public access to essential medicines, and *importation* from abroad

• Several highly-publicized and political *compulsory license* attempts (Thailand, Brazil, Rwanda, Italy)
Comparing CleanTech and Medicines: Markets

• Similarities
  – Urgent health-based “need” for broad deployment in Tier 3 Countries
  – Potential price barriers to deployment in Tier 3 Countries

• Differences
  – Benefits global, not local → products not desired/valued by local consumers (i.e., “push” not “pull”; eliminates benefit of pricing “high” along steeply-convex demand curve)
  – Capital-intensive products (hydroelectric, wind, photovoltaic), in addition to commodity products (biofuels)
  – Multiple competing producers in each product category
  – Pharma is a single “industry” with a coherent “voice”; CT is fragmented / many industries
  – Strong producers in Tier 2 (China, Brazil, India)
    -- Prevalence of industry/govt. standards
2009 Patent Survey

- Western companies dominate (82% from USA, Japan and Germany alone; effectively 0% from Developing Countries)
- Industry is fragmented – little overlap among patentees across categories
- Most patentees are corporate (very few academic/government/non-profit)
- Not very many patents!
  - 823 of 167,349 total issued US patents in 2009 (0.49%)
  - About 17% of patents issued just to IBM (4887)
  - Small compared to other categories (molecular bio (cl 435) 2703, multicellular organisms (cl 800) 841)
Comparing CleanTech and Medicines: IP

- CT patents generally narrower than pharma
  - Patents have expired on many technologies (basic biofuels, turbines, ethanol conversion)
  - Claims cover improvements rather than active ingredient/molecule
  - Royalty rates are comparatively low on CT products
  - Alternatives exist (variant products)
  - Inter-sectorial competition (e.g., photovoltaic v. biofuel)

  → compulsory licensing not critical for enablement/dissemination in Tier 3

- Greater dependency on technical expertise
  - Complex installations and capital equipment often required
  - Reverse engineering/piracy less effective (and thus less problematic)

  → Tech transfer is a principal bottleneck

Barton (2007), Barton (2008)
The Question of Innovation

• Two distinct engines for R&D innovation
  – Commercial R&D
    • supported by *ex post* monopoly rents
  – Government-subsidized R&D (often academic)
    • supported by *ex ante* grants

• These incentive engines promote innovation at different levels
  – Pre-commercial: basic science/understanding
  – Commercial: implementation, commercialization, productization
Patenting and CT Innovation

• Government may fund both academic and industrial research
  – ARPA-E $400M CT funding mandate

• When university R&D is government-funded, patent incentives may *not* add incremental incentives to innovate
  – Patents confer a benefit on private industry/academia based on research that may have occurred anyway (redundance/over-compensation)
  – Major purpose of U.S. Bayh-Dole Act of 1980, is to strengthen U.S. industry/competitiveness, not achieve global technology diffusion

• Drawback of patenting is proprietary treatment of generated ideas, less dissemination/utility

• In areas where rapid, broad dissemination is desirable (e.g., basic CT science), patenting may hinder the broadest innovation platform from developing

• Greater dissemination/innovation through accessible pools of basic research knowledge? (*commons*)
Innovation Tiers

Commercial Development (Patent incentive)

Government-Funded Research (Commons)

Non-proprietary Innovation

Products
The Role of Standards in CT

• Standards are ubiquitous in modern commerce
  – Adherence to common protocols and designs
  – Safety, quality, envtl. impact, interoperability
  – Can be mandatory or voluntary

• CleanTech standards being developed in:
  – Biofuels and chemicals
  – Power and SmartGrid
  – Materials, sustainability, automotive, CO2, etc.

• Patent issues for standardized technology
  – Hold-up (threat of undisclosed patents post adoption
  – Stacking (threat of too many patents)
A Two-Pronged Approach to Clean Tech Deployment in Developing Countries

1. Dissemination (Technology Transfer)
   - No TRIPS-based IP exceptions (i.e., compulsory licensing)
   - Tier 3 governments grant selected CT vendors time-limited supply exclusivity (based on competitive bidding)
   - In exchange for exclusivity, vendors commit to
     • beneficial pricing
     • long-term support of CT initiatives
     • funding for CT training and knowledge infrastructure
   - Tier 3 governments agree to lift restrictive tariffs on CT imports from “funding” countries
   - Governments to favor royalty-free CT (e.g., emissions, biofuels, etc.) when adopting mandatory standards
A Two-Pronged Approach to Clean Tech Deployment in Developing Countries

2. Innovation (Commons Building)
   - Tier 1/2 governments increase R&D funding for CT R&D (esp. as specific to Tier 3 implementation)
   - Tier 1/2/3 governments refrain from issuing patents on government-funded basic CT research
     • US agencies can issue “exceptional circumstances” ruling under Bayh-Dole
   - Tier 3 governments offer special research/innovation incentives for in-country CT innovation
   - Tier 1/2 suppliers contribute to local R&D infrastructure building