



International Technology Collaboration and Low Carbon Innovation: Recasting “Truisms” with insights from emerging economies

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UNITED NATIONS WORKSHOP ON DEVELOPMENT, TRANSFER AND
DISSEMINATION OF CLEAN AND ENVIRONMENTALLY SOUND
TECHNOLOGIES

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Is this technology sustainable?

<http://www.youtube.com/watch?v=a9fpolCvM-8>

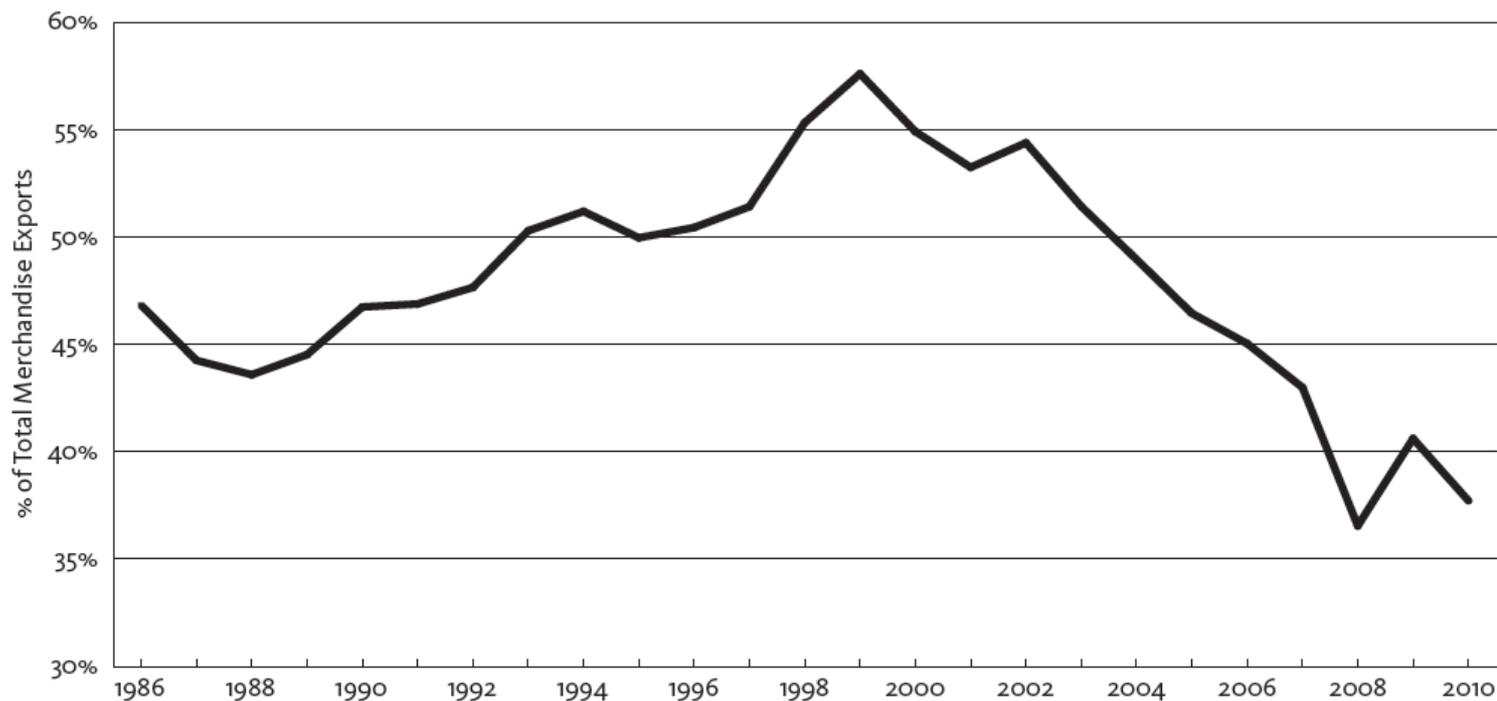


Recap

- Defn - inclusive and importance of the private sector (Dalhman)
- Systemic approach and networks important (Sagar)
- World is changing - Rise of South (Srinivas)



FIGURE 1 Value-Added Products as Share of Total Canadian Merchandise Exports, 1986–2010

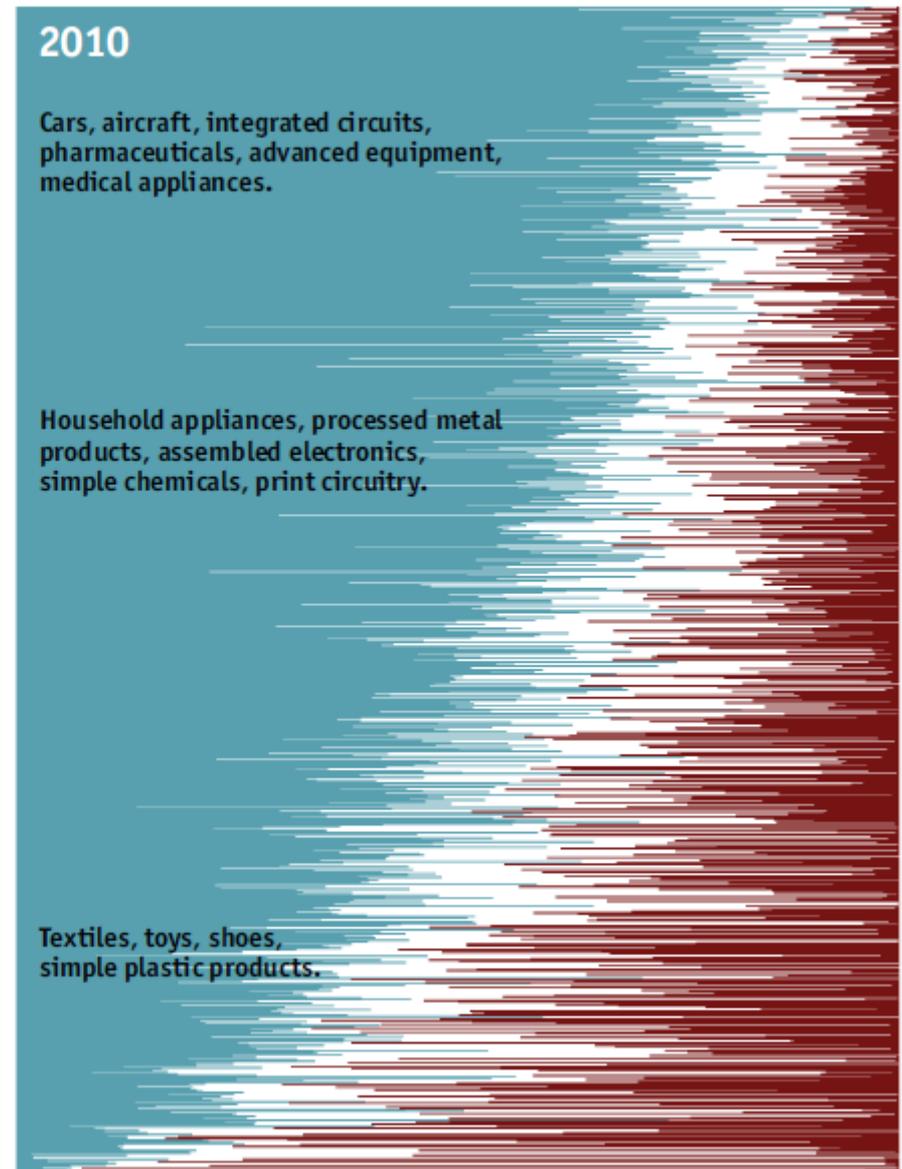
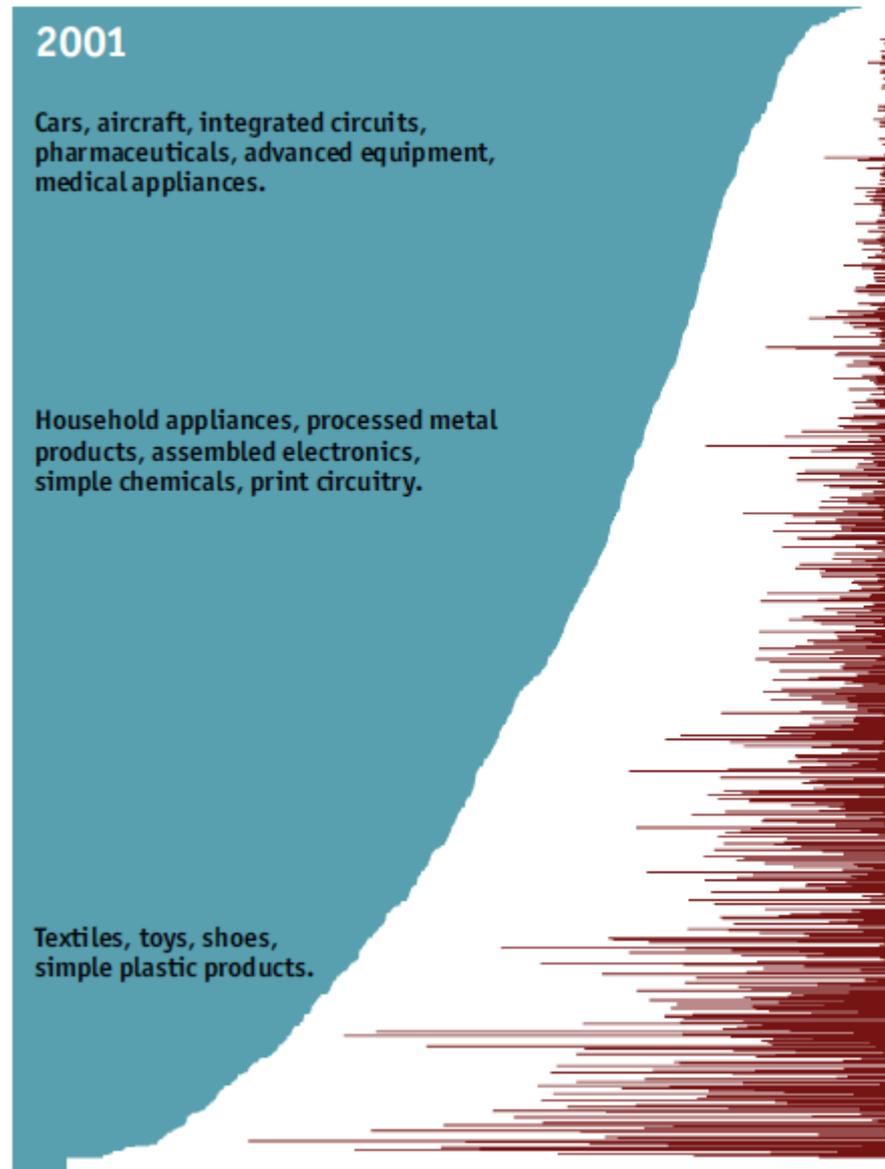


Data on Canada - Source: Stanford 2012

China exports: climbing the ladder, regional share of global exports in 2001 and 2010

(export product categories sorted by developed economies global export share in 2001)

■ Developed □ World ■ China





Why are clean and environmentally sound technologies unique?

- Urgency (climate change, voracious appetite for NR in era of increasing scarcity)
- Public good - govts can take the 'long view'
- Often technologies are immature / less known in settings

Technology Approach so far: focus on output



Key Themes	Conventional notions	Emerging Perspectives
Movement of goods and services (technologies)	<ul style="list-style-type: none">• North to South• Technology transfer• One way	
Solutions	<ul style="list-style-type: none">• Technical / economic options• Bias for over-arching prescriptions• Piecemeal	
Policy measures	<ul style="list-style-type: none">• Direct; intl and natl level	
Innovators and innovation	<ul style="list-style-type: none">• Experts; frontier, 'breakthrough' technologies• Linear	
Actors	<ul style="list-style-type: none">• Donor / recipient• Often 'lumped together'	
Channels	<ul style="list-style-type: none">• Within firms is dominant (from HQ to subsidiary)• Between firms – JVs and licensing (North to South)• Some triple helix	



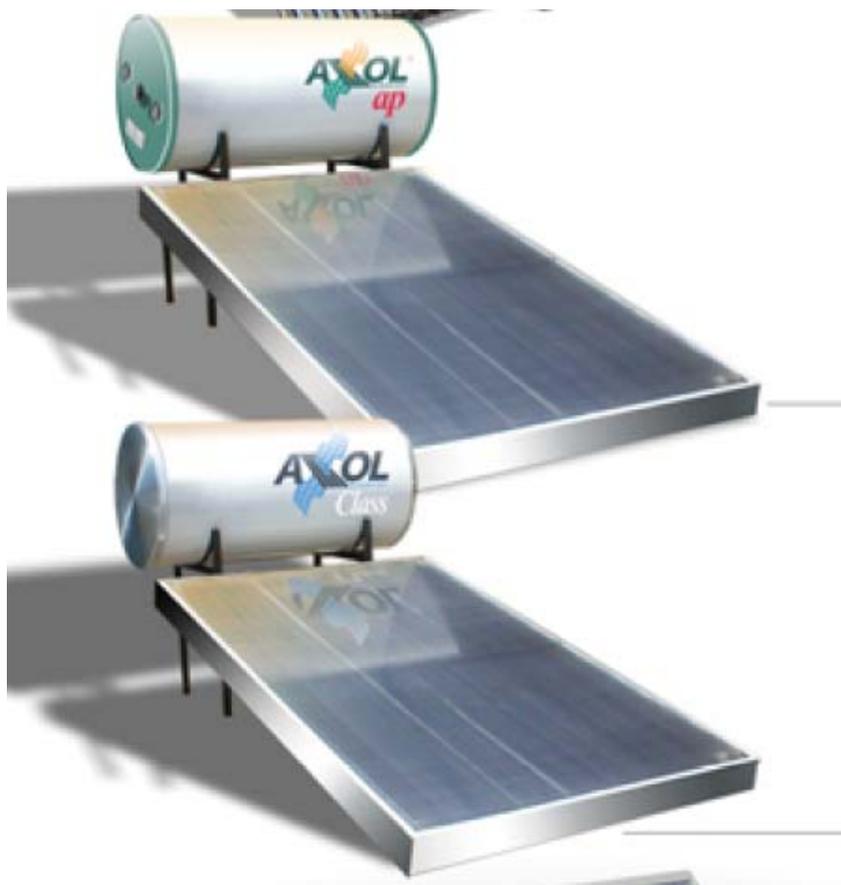
Two distinct features with research approach:

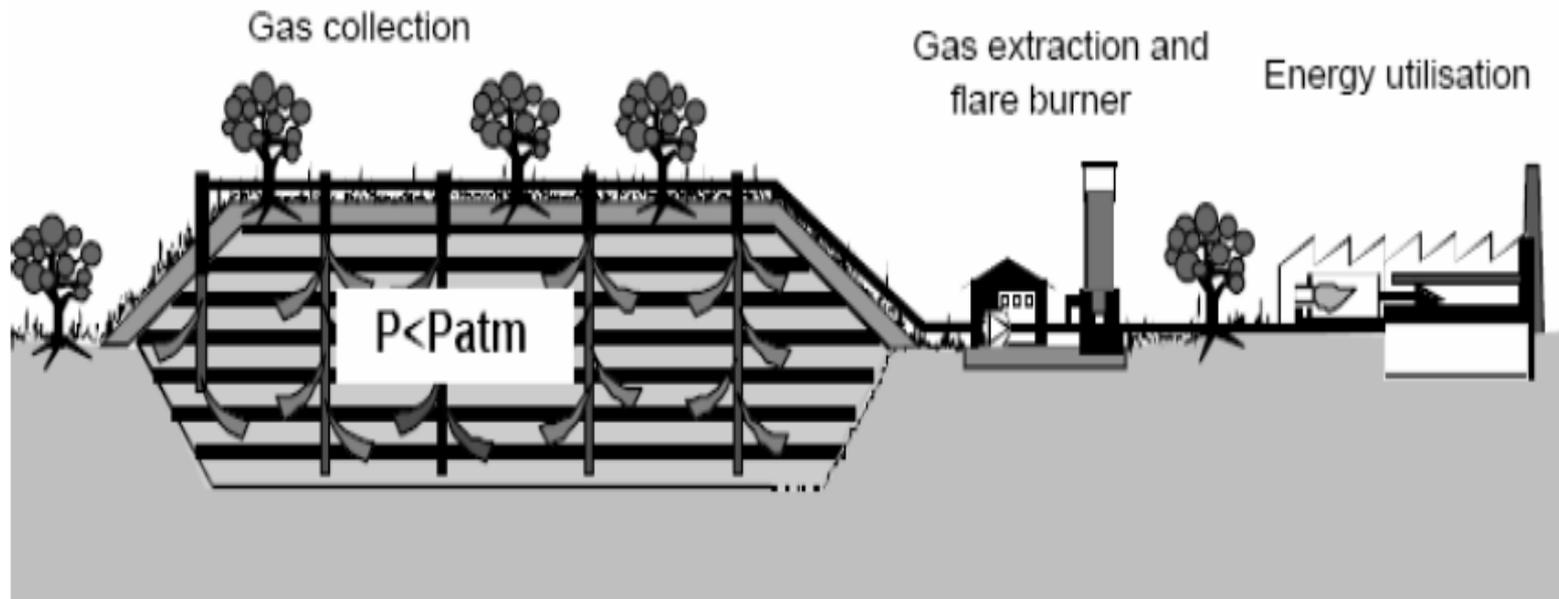
- Systematic approach (attempts to capture various dimensions)
- Innovation *and* adoption (integral relationship between how a technology is developed, produced and used)

Empirics

- Informed by research in Mexico, Brazil, India and China and beyond - cities and national level and mitigation; leading-edge and 'appropriate'; consumers and producers
- Mainly: Solar water heaters, biogas, PV, wind, IGCC, EE techs for SMEs





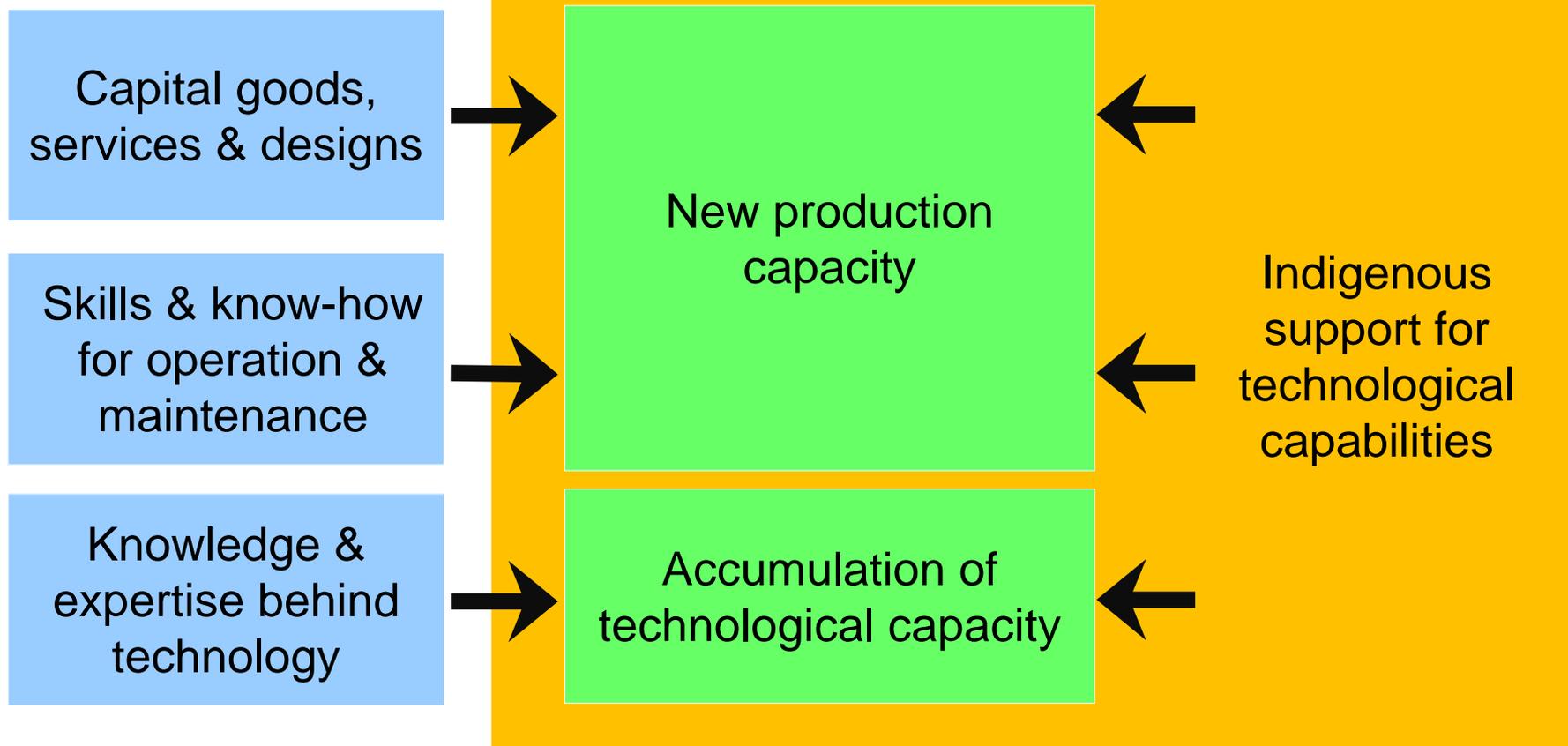


Source: Clean Development Mechanism Project Design Document
(CDM-PDD) Bandeirantes 2005, p. 5



Technology Transfer

National Innovation System





KEY CONCEPTS

Innovation

World, market, organization

Innovation capacities

Know-why, principles, Flow C, knowledge

Technology cooperation

Two or more-way flows

Socio-technical fit

Social / cultural dimensions





What is happening?

Bulk of activity - private sector

Channels - are changing

- JVs and subsidiaries and licenses (Tata BP solar, GE, GM)
- BUT also acquiring majority share or outright purchase of Northern firms (Reva, Suzlon / Goldwind)
- Movement from technology transfer to cooperation - perceptions are changing

India - emerged as a key destination for offshore corporate R&D (Herstatt et al. 2008)



Innovation and Innovators are changing

Leadbeater (2005) “special people in special places”

- Sociedade do Sol and frugal innovation (MacGuyver)
Termed *jugaad* in Hindi, *gambiarra* in Brazil, etc.; an “innovative fix; an improvised solution based on ingenuity and cleverness” (see Radjou et al. 2012); pro-poor innovation (Kaplinsky 2011)

<http://www.sociedadedosol.org.br/en/presentation.htm>

Open innovation

Non-linear innovation

R&D in the South - to North (GE and GM)



SOCIEDADE DO SOL

home quem somos projeto ASBC resultados como fazer fale conosco

HOME



ASBC: Sigla de **Aquecedor Solar de Baixo Custo, projeto gratuito** de um aquecedor solar de água, de 200 a 1.000 litros, destinado a substituir parcialmente a energia elétrica consumida por 36.000.000 de famílias brasileiras usuárias do chuveiro elétrico, em casas e apartamentos.

Este projeto está sendo desenvolvido, desde janeiro de 1999, pela ONG Sociedade do Sol, sigla SoSol, sediada no CIETEC - Centro Incubador de Empresas Tecnológicas, no Campus da USP/IPEN.



Chalés com ASBC no interior paulista

O projeto contou em sua fase inicial com o apoio da FAPESP, MCT, CNPq e FINEP.



ASBC

Aos interessados no Aquecedor Solar de Baixo Custo (ASBC), sugerimos a leitura da [Introdução à forma de disseminação da tecnologia do ASBC](#) antes de dar início em suas pesquisas pelo [site](#).

últimas notícias

- **CONVOCAÇÃO PARA AS ASSEMBLÉIAS ORDINÁRIA E EXTRAORDINÁRIA EM 28/02/2011.**
Clique nos links abaixo para conhecer os editais:
 - [- edital AGO](#)
 - [- edital AGE](#)
- [PRÓXIMOS CURSOS DA SOSOL](#)
Fonte: Newsletter da SoSol.
- [Estudantes produzem aquecedor solar](#) fonte: [site do Jornal A Cidade - Ribeirão Preto](#)
- [EcoMoradia terá Aquecedor Solar de Baixo Custo](#) fonte: [site da Prefeitura de](#)

CADASTRE-SE

para receber por e-mail as novidades desta entidade



SOCIEDADE DO SOL
CURSO ASBC
Aquecedor Solar de Baixo Custo

INSCREVA-SE E SEJA AVISADO!

Inscrições online

Assista ao vídeo/aula sobre a "Importância da Energia Solar" apresentada pelo Prof. Augustin T. Woelz



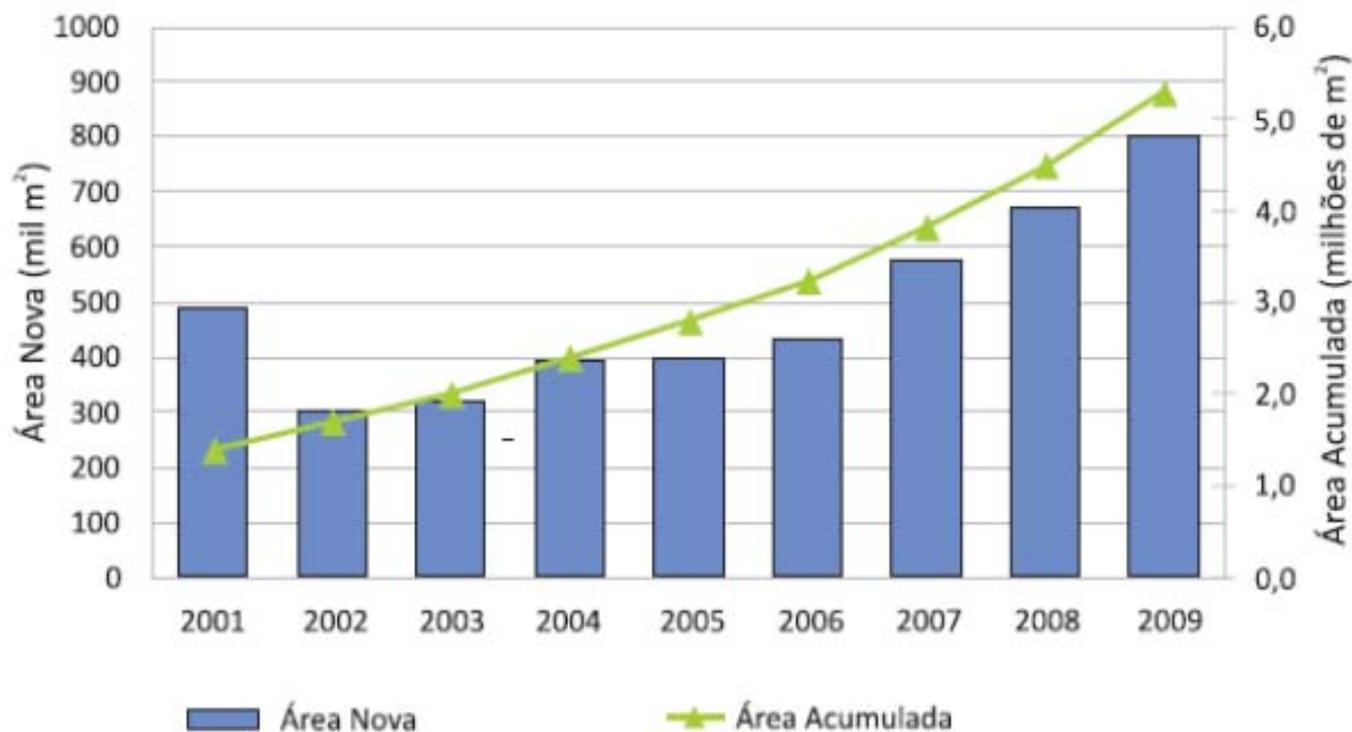
OBS.: essa apresentação pode demorar para carregar se a velocidade de sua conexão for baixa
[Para fazer o download do arquivo compactado dessa apresentação clique aqui](#)

Recomendado:
Construção Sustentável
pela ANAB - 80 horas



Examples - Context: Experiences matter

Evolution of Solar Water Heater market in Brazil (2009) (ABRAVA-DASOL 2010)





Context: Experiences matter

Apagão of 2000 / 2001

Impact of negative perception (SWHs in Mexico - all painted with the same brush - major ramifications - word of mouth)

But not with biogas technologies - social construction of technologies - less entrenchment, more room for change?



EXAMPLES Policy measures - Indirect policies are also key (Privatization yes, but mainly foreign investment / industrial rules key; taxes less of a role)

Supply chain issues

Solar Water Heater “Wars”

Govt-sanctioned standards: INMETRO seal

Perceptions – “ownership” vs. “inferior imports”

China – 863 programme; complement 973 (benefit of time – 1986, 1997)

Sub-national / local level? State policies to complement national level in India (PV); Brazil and Mexico – targeted municipalities just getting implemented (modeled on Barcelona)

Disconnect? International mechanisms little salience for Indian firms while CDM played a role in wind in China; SWHs little, whereas biogas very important





EXAMPLES Actors - Relationships matter

São Paulo – networks are more institutionalized, organized, unified – more examples of cooperation across sectors (academic, govt, industry and (albeit only a little) citizens; two streams but groups come together on larger issues; strong indigenous expertise

Mexico City – links are more recent, *ad hoc*; public-private partnerships exist but not considered effective; more in-fighting and more difficult to mobilize groups; less indigenous expertise but growing

India – more rapid rates of low carbon uptake when international links present

Key Themes	Conventional Notions	Emerging Perspectives
Movement of goods and services (technologies)	<ul style="list-style-type: none"> • North to South • Technology transfer • One way 	<ul style="list-style-type: none"> • South to South, South to North • Technology cooperation • Two or more ways
Solutions	<ul style="list-style-type: none"> • Technical / economic options • Bias for over-arching prescriptions • Piecemeal 	<ul style="list-style-type: none"> • Social dynamics just as if not more important • Context matters (experiences) • More systematic
Policy measures	<ul style="list-style-type: none"> • Direct; intl and natl level 	<ul style="list-style-type: none"> • Disconnect? Indirect; local level
Innovators and innovation	<ul style="list-style-type: none"> • Experts; frontier, 'breakthrough' technologies • Linear 	<ul style="list-style-type: none"> • 'lay people' and experts; incremental, adaptive technologies; frugal innovation • Non-linear
Actors	<ul style="list-style-type: none"> • Donor / recipient • Often 'lumped together' 	<ul style="list-style-type: none"> • Partners; engaged throughout, in a meaningful way • Heterogeneous
Channels	<ul style="list-style-type: none"> • Within firms is dominant (from HQ to subsidiary) • Between firms – JVs and licensing (North to South) • Some triple helix 	<ul style="list-style-type: none"> • Within firms (subsidiary to HQ) • Acquisition or majority ownership of Northern by Southern firms • While rare, some instances of quadruple helix



Considerations in Developing a Technology Facilitation

Mechanism

- 1) More attention needed on the technology cooperation *process*
- 2) Things happening but public policy action needed (esp. SMEs)
- 3) Engaging local partners (early on, more meaningful ways)
- 4) International involvement - increase rate of diffusion
- 5) Policy 'windows' - build on momentum, less entrenched
- 6) Disconnect with international policy mechanisms? Indirect policies are also key (trade)
- 7) South-North: China / India - Germany, Canada; **Subsidiary to HQ (India to US)** and South - South: **Brazil and India (biomass; 'unfinished' adapted), Sociedade do Sol - intl cooperation;**



Ways Forward

- 1) Low carbon innovation centres
- 2) Cross sectoral partnerships
- 3) Policy coherence across jurisdictions and issues e.g. Microgrids - hype buzzword or feasible?
- 4) Collaborative international RDD&D - National Hybrid Propulsion Program (creative ways to address IPRs), ownership, diaspora

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