



# **ANALYSIS OF GOVERNMENT POLICIES DESIGNED TO INFLUENCE INVESTMENTS IN RENEWABLE ENERGY**

**Vladimir Atanasov, Ph.D., Mason School of Business, College of  
William and Mary**

**April 13, 2011**

# Government Influence on Renewable Energy Is Pervasive

- IEA has a searchable database of Global Renewable Energy Policies
  - <http://www.iea.org/textbase/pm/?mode=re>
  - 707 policy initiatives in force globally
  - 71 in the US

# Why Do Governments Do It

- Market failure
  - Externalities
  - Information problems
  - Coordination problems
- Government advantages
  - Lower financing costs
  - Longer horizon
  - Richer set of objectives beyond profit maximization



# How to Influence Investments in Renewable Energy

- Depends on whom is being influenced
  - What are their objectives
  - What decisions tools do they use
  - What inputs do they use
  - What are their priors/beliefs

# Who Makes Investments in Renewable Energy Decisions and How

- Utilities
  - Static capital budgeting tools
  - Possibly dynamic capital budgeting tools
- Businesses
  - Static capital budgeting tools

# Who Makes Investments in Renewable Energy Decisions and How


- Households
  - Gut feeling
  - Payback
  - Consider non-monetary objectives
- Government agencies/ Non-profits
  - Payback
  - Possibly static capital budgeting tools
  - Consider non-monetary objectives

# How Do Governments Influence Voluntary Investments in Renewable Energy

- Upfront capital investments
  - Tax credits for investments in renewable energy
  - Research grants to lower capital costs
- Operating Cash Flows
  - Revenue
    - Price surcharges for renewable energy (feed-in tariffs)
    - Revenue from trading green certificates (units of certifiable renewable energy)
  - Operating costs
    - Research grants to improve technological efficiency/lower operating costs
    - Levies for pollution and cleanup costs of fossil fuels

# How Do Governments Influence Voluntary Investments in Renewable Energy

- Lower financing costs
  - Debt guarantees
  - Low cost direct government loans
  - Government-private joint ventures
- Lower uncertainty?
  - R&D grants to resolve technological uncertainty
  - Large government contracts to stabilize demand



# How Do Governments Influence Voluntary Investments in Renewable Energy

- Non-monetary efforts
  - Advertising campaigns
  - Research on climate change
  - Best practice guides
  - Advice on implementation

# Forced Investments in Renewable Energy

- Quota obligation systems
  - Certain minimum percentage of generated power must come from renewables
  - Certain minimum percentage of purchased electricity must come from renewables
  - Usually combined with tradable green certificates

# A Failed Government Policy (Bloomberg Magazine, Nov 2010)

- Spain passes a law in 2007 that guarantees solar power investors a feed-in tariff of as much as 44 cents/kWh for 25 years (10 times more than wholesale price)
- Part of an effort by Spanish government to:
  - Reduce dependence on fossil fuels
  - Create manufacturing jobs in solar panel industry
  - Export solar panels to rest of Europe

# A Failed Government Policy (Bloomberg Magazine, Nov 2010)

- Approach is to compensate for cost disadvantages of solar with a 10 times higher than market guaranteed output price
  - Goal of government to have 400 megawatts installed power by 2010
- Subsidy proved too generous
  - By the end of 2008 installed power increases to 3500 megawatts

# A Failed Government Policy (Bloomberg Magazine, Nov 2010)

- Other market distortions
  - Spike in solar panel demand – 28% increase in price
    - Most of gains go to Chinese producers, Spanish firms do not have the capacity to respond to explosive demand
  - Repurposing of agricultural land (vineyards, orchards ...)
  - Individuals mortgage homes to finance investments in solar power capacity

# A Failed Government Policy (Bloomberg Magazine, Nov 2010)

- Annual tariff payment increase dramatically
- New government reduces solar tariff for new installations by 25% in September 2008
  - No further investment in solar power in 2009
  - Many local producers of solar panels become insolvent
  - Number of jobs in industry falls from 180,000 to 116,000

# A Failed Government Policy (Bloomberg Magazine, Nov 2010)

- In 2009, solar power receives 1/3 of renewable energy subsidies paid by the Spanish government, yet it produces only 8% of renewable energy
- Expected lifetime cost of original guarantees is 126 Billion Euro
- In August 2010, the Spanish government slashes the subsidies for installed capacity by 5 to 45%, even though original contract was for 25 years

# Takeaways from the Spanish Experience

- No open ended feed-in tariffs
- Stage subsidies to give local manufacturing firms time to increase capacity
- Recognize and evaluate opportunity costs
  - Land
  - Capital
  - Human resources
- Repudiating government obligations adds further uncertainty

# Still, Some Long-term Benefits

- A few surviving companies are technology leaders in solar power
  - Abengoa Solar
- Significant investments in R&D, which otherwise would have not been made
- Testing ground for new technological concepts
  - First Concentrated Solar Power Tower installation

