

## ***Will the clean energy be the new financial bubble?***

Wiston Adrián Risso  
*Department of Economy*  
*University of Siena*

Recently, the US economy has been witness of two big bubbles: the dotcom and the housing bubble. In fact, some people say that the US economy is a “bubble economy”, growing when some sector presents an overvalued trend and entering in recession when the trend disappear and the sector adjusts to reasonable levels. The latter seems to be true in the case of the dotcom bubble, when many investors believed in a “New Economy” where the physical investment was useless. However, the crash in 2000 shows that the fundamental principles of the physical economy still worked. The curious thing is that after the disillusion in a “virtual economy” the investors overreacted investing in the real economy. Thus, a new bubble developed in the real estate, at the first part of the present decade. Again when the acceleration in prices was excessive, the bubble burst and the consequences are palpable.

Now, different analyst and investors are wondering what will be the next financial bubble. That is a very difficult question indeed. In the last months, many candidates have been mentioned: Emerging market, institution specializing in retirement, infrastructure investment, bond market, credit card, oil market and clean energy.

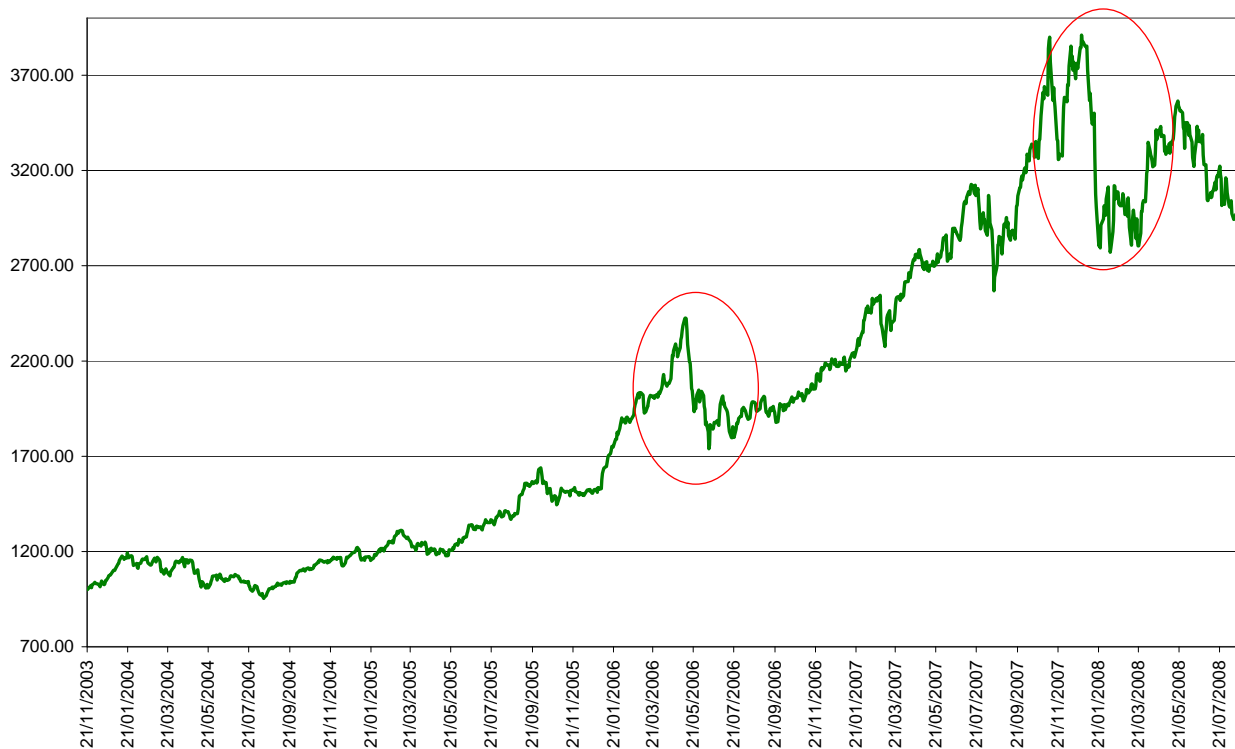
I would like to talk about the possibility of developing a bubble in the clean energy due to two reasons. First, as know, nowadays there is an important debate about the feasibility of solving the energy problems with the existing technology without the necessity of breakthrough innovations. In fact, given the high cost of petroleum, some people think that there is a necessity of using new technologies using alternative energy sources. However, many persons suggest that the change would be highly expensive, and is not feasible in the short term.

The second reason is that some analysts such as Eric Janszen suggest that there are many reasons helping the developing of a bubble in the clean energy sector: 1) bubble is forming as the previous bubble deflates; 2) There is a favourable tax treatment and other protections and advantages; 3) is popular, “its name is on the lips of government policymakers and journalists”.

On the other hand, a revolution in the technology sometimes facilitates the developing of a bubble, that was true in the internet revolution and some people believe that electricity also played an important role in the bubble of 1920s. However, we cannot talk about a real clean energy revolution at the moment. There are only seeds of a possible revolution. In fact, according to the [www.eia.doe.gov](http://www.eia.doe.gov) the total consumption in renewable energy increased 7% between 2005 and 2006, at the same time the total US energy consumption decreased 1%. This implies that the renewable energy's share of total US energy arrived to 7% from 6% in 2005. On the other hand, some companies working in the sector such as First Solar present a cumulated annual return of 167.11% (from 03/08/2007 to 04/08/2008), when the financial markets are falling down!!

Let us start analysing the S&P Global Clean Energy Index which recovers the weighted performance of 30 companies working in the clean energy sector (such as First Solar Inc, Solarworld AG and Sunpower Corp). Daily data from 21 Nov 2003 to 14 Aug 2008 was obtained from S&P ([www2.standardandpoors.com](http://www2.standardandpoors.com)). Figure 1 shows the evolution of this index.

**Figure I: Evolution of the S&P Global Clean Energy Index**



In figure I we can recognize two important Drawdowns, at first not that from 9 May 2006 to 13 June 2006 the index passed from 2425.93 to 1739.57 losing 28.29%. However, the maximum drawdown was present between 26 December 2007 and 7 February 2008 (from 3911.68 to 2771.08) losing 29.16% and note that the index did not recover from the maximum peak on 26 December 2007. Actually, note that the index seems to be presenting a decreasing trend in the present time.

Let us analyse now, the level of informational efficiency in the sector. As I suggested in some articles the entropy seems to be a good indicator of the efficiency in the financial markets, playing an important role in the proximity of a crash (see Risso (2008), "The Informational Efficiency and the Financial Crashes", *Research in International Business and Finance*, Vol. 22, pp. 396-408.).

**Figure II: Evolution of the informational Efficiency for the S&P Global Clean Energy Index**

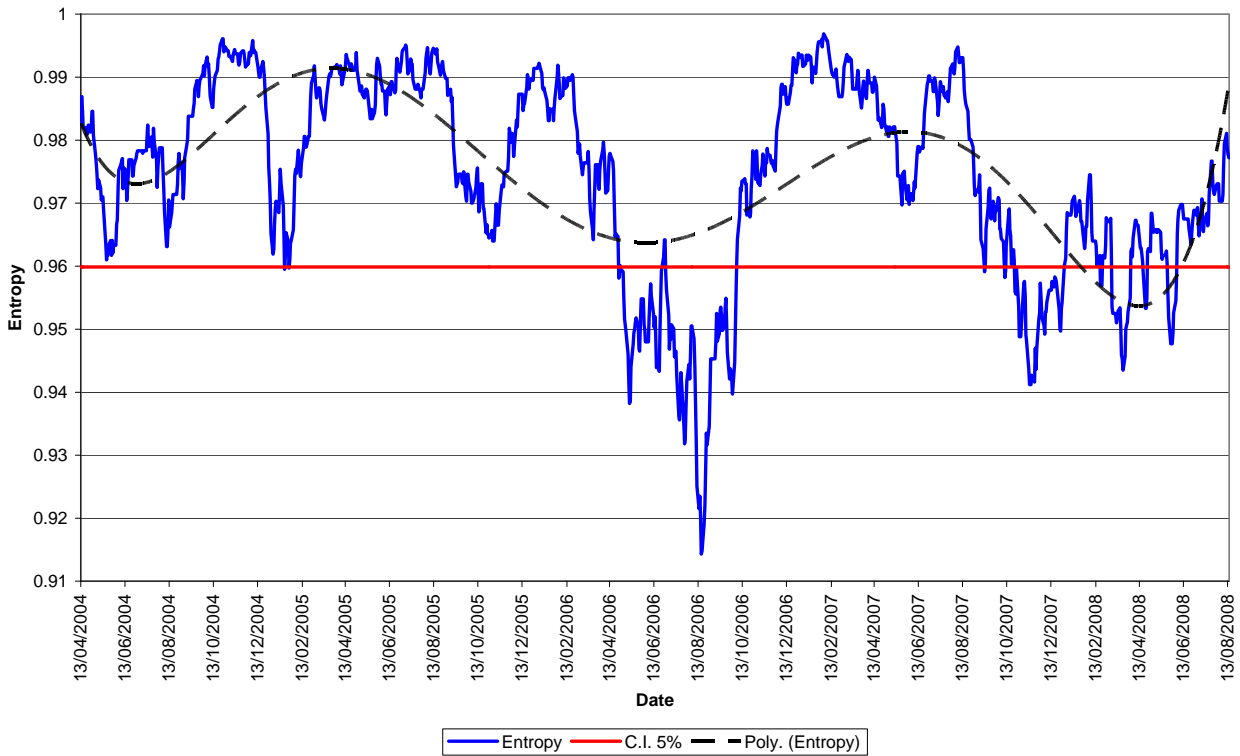


Figure II present the evolution of the informational efficiency for the index, from 13 April 2004 to 13 August 2008. The dashed line is a polynomial trend of the efficiency and the red line is a limit of efficiency for finite samples according to 2,000 Monte Carlo simulations. Note that according to the trend there was only a clear cluster of inefficiency between 22 January 2008 and 9 June 2008. However, nowadays seems to be not signs of inefficiency in the market, actually the efficiency is growing up.

Let us compute the impact of the efficiency in the probability of a crash. Defining a crash as the negative tail of the empirical distribution of the returns (actually I take 1% as limit) and applying a logit model such as equation (1) where  $H$  is the entropy and  $y$  is a variable taking 1 when there is a crash and 0 when there is not.

$$p(y_t = 1) = \frac{\exp(\alpha + \beta H_t)}{1 + \exp(\alpha + \beta H_t)} \quad (1)$$

**Table I: Logit Model for the S&P Global Clean Energy Index**

Observations = 1130		LR $\chi^2(1) = 14.57$		
Log Likelihood = -113.45		Pseudo- $R^2 = 0.0546$		
Crash prob. <sup>c</sup>	Coefficients	Standard error ( $\sigma$ )	t=coeff./ $\sigma$	p-Value> t
Entropy ( $\beta$ )	-18.01	4.72	-3.82	0.000 <sup>b</sup>
Constant ( $\alpha$ )	15.45	4.56	3.39	0.001 <sup>b</sup>

The results were obtained with STATA program. Source: own calculations

<sup>a</sup> It indicates that the model is significant at 5%

<sup>b</sup> It indicates that the coefficients are significant at 5%

<sup>c</sup> It is the estimation of Eq. 3

Table I summarize the results. Note that the model is significant and a negative relationship is found between the entropy and the probability of crash.

Therefore we can conclude that the clean energy market is efficient nowadays (at 13 August 2008) and presenting a growing efficiency. On the other hand, the probability of having a crash is decreasing given the negative relationship between the two variables.