

I appreciate Mr. Glantz's extra effort to provide a balanced report on the emerging Green Economy. His blog, "The Facts On Green Jobs" [1], slightly improves his 18-Aug-2011 article [2]. Nonetheless, in my opinion, he is still, analogously, looking at the rear-view mirror to drive down the road, steering his car by watching only where he's been, rather than watching where he's going through the front windshield. And, giving him the benefit of the doubt that he accurately represented and/or interpreted what "dozens of people..." told him, it also appears there's a strong undercurrent of instant gratification, numerical illiteracy, and/or unrealistic expectations driving many of his sources.

Rear-view 2003 – 2010 data can only be used to *estimate* growth over the next decade. Because the future hasn't happened yet, it's inappropriate to use this data to assert conclusions about actual growth between 2011 and 2020. For example, Governor Brown's stated goal is to create 500,000 new Green Economy jobs in California "by the end of the decade", i.e. within the next 9 1/3 years. Governor Brown began his term only 8 months ago, so it's premature to expect any significant growth toward that 10-year goal in only 8 months, especially in a stalled economy. Both Obama and Brown are "hoping for", i.e. forecasting 500,000 and 5 million new Green jobs, respectively, over a future, not a past, 10-year period.

Even in a robust economy, any new business growth follows the classical "S Curve" [3]: slow at first during its startup phase and then accelerating rapidly during the growth phase--and that's in a healthy economy. In this stalled economy, growth, if any, in all phases will be very slow.

In the end, Mr. Glantz found that — so far, i.e. 8 months into Brown's 10-year "hope", and 2 ½ years into Obama's 10-year "hope" — "job growth in the green jobs sector has been less than what politicians hoped for." Really!? Mr. Glantz went to all that effort just to report a self-evident truth? That is, given the reality of S-Curve slow-at-first growth, at 8 months or 2 1/2 years, it's premature to assert any definitive conclusions about politician's 10-year hopes, whether ultimately success, failure, lackluster, or "pipe dream".

It's taken a long time, against major resistance, to solidly initiate serious efforts to achieve the goal of a Green Economy set forth in the early 70's [12]. President Reagan's pro-oil agenda[4] in the 80's eliminated or greatly reduced political support for then Governor Brown's (1975-1983) and President Carter's[10] clean-energy innovation agendas for over 20 years. After such protracted delay, Governor Davis presided over *reinitiating* political support for California's Green Economy startup phase by finally signing AB-117 in 2002. Governor Schwarzenegger asserted additional political support with the passage of AB-32 in 2006. AB-32 received great resistance from oil interests as recently as 2010, as exemplified by California's Proposition 23, which was heavily backed by oil companies [13].

Despite long-term resistance by oil interests, entrenched for nearly a century, on 24-Sep-2009, Dr. Burns, Chairman, Dow-Corning [5], in her statement to Congress's Select Committee on Energy Independence and Global Warming, said, "America is at the dawn of a new energy era" [6], and Dow-Corning expects to achieve grid parity in 2-5 years [7], i.e. within 3 years from now (9/2011). In other words, during the 2003 thru 2010 time period, the Green Economy was only in its earliest phase of a second startup attempt.

Growth during a startup phase is always slow at first, and, especially modulated by stalled U.S. and California economies and by a dysfunctional U.S. Congress, California's Green Economy, in 2011, is still in the slow-growth startup phase. Once past the startup phase, typical growth rates are exponential and then slow asymptotically toward a maximum. Possibly, the Green Economy is close to the "knee" of the

growth curve (S-Curve), and growth might start accelerating soon. Certainly that's Dr. Burns' expectation [7] and also that of the March, 2011 report, "Emerging Industry and Technology Sectors in Silicon Valley's Green Economy: Workforce Implications":

*"...over the next 12 months: Green employers expect a 9.2 percent employment growth rate versus California's overall projected 2011 employment growth rate of 1.6 percent. Emerging green employers expect an even faster growth rate of 11.6 percent in the next 12 months."*  
[8]

Let's say California's Green Economy is entering the accelerated growth stage. What would the annual growth rate have to be to achieve Governor Brown's 10-year forecast? The accelerated growth phase is essentially exponential, so a reasonable approximation of annual growth is given by  $N(t) = N(0) \cdot \exp(rt)$ , where  $N(0)$  is 318,156, the number of 2010 Green jobs in California [9],  $t$  is 10 years, and  $N(t)$  is 318,156 + 500,000 = 818,156. The annual rate,  $r$ , is calculated to be 9.45% (see [14] for step-by-step how to), and this rate corroborates the average 10% growth rate forecast above for 2011. If California has actually entered the accelerated growth phase, then if the 9.45% rate is sustained until 2020, then Brown's forecast is a realistic estimate and far from a "pipe dream". A similar case can easily be made for President Obama's forecast of 5M additional Green jobs by 2018.

Development and implementation of renewable clean energy technology has a history of delays since President Carter's Energy speech in 1977[10] and support for solar energy [11]. After 30 years delay, there's a consequent increased urgency to adopt clean energy technology. Nonetheless, however so urgent it may be, it's unrealistic to expect immediate growth just because AB-117 (2002) and AB-32 (2006) were passed or because politicians are finally motivated to once again support establishing a Green Economy. Establishing any business, including funding, technology development, engineering, manufacturing, training, sales, and deployment all take a frustratingly long time—what we can imagine in minutes can take many years to realize. Once technologically realized, the time to acceptance is usually compounded by typical resistance to anything new and different [15]; and by resistance from those who profit from the old. It takes time to move through matter and to change minds.

Hence, given the urgent need for deploying renewable clean energy technology, it's more important than ever to explain the benefits to the public and to offer constructive, realistic, and accurate information to interested participants, investors, and businesses. We have another opportunity—now 34 years later—to usher in a new energy era. Each of us can choose: to be cynical, pessimistic, do-nothing naysayers; or to be among those who help make it happen.

#### References:

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