Holly's latest post about a new study showing that cap-and-trade programs have not led to technological innovation ends with a cautionary note that raises the key question about innovation and cap-and-trade programs to reduce greenhouse gas emissions:

> These results [showing no innovation] don't mean that cap-and-trade has no role to play in policies directed at climate change or other problems whose solution requires innovation. But they emphasize one more time the need to carefully design cap-and-trade programs, and in particular to resist pressures to set the cap too high.

California is about, of course, to launch its cap-and-trade program to reduce greenhouse gas emissions. The state's approach has at least two buillt-in design elements that other cap-and-trade programs have not included and that have the potential to encourage the kind of innovation cap-and-trade proponents have long predicted.

One of the persistent problems in designing cap-and-trade programs to spur innovation has been that the overall cap on emissions is both set too high and then remains too high, leaving prices for allowances lower than initially predicted. As a result, emitters purchase allowances at low prices and then bank them for use in future years and can comply with their allowance limitations quite easily with existing technology. Lesley McAllister has analyzed four major cap-and-trade programs and argued that the caps were set too high — with resulting low allowance prices — in each one.

California's program may well avoid the too-high-cap and too-low-allowance-price problem. The most obvious way in which the state may do so is by imposing a cap that declines annually rather than remaining constant over time. The cap will decline by approximately 2 percent between 2012 and 2013, 2 percent between 2013 and 2014 and 3 percent annually until 2020. As compliance costs increase, emitters should seek new ways to reduce emissions at the cheapest price possible in order to avoid paying more for allowances. But the state program also adopts a new and innovative approach to maintaining stability in allowance prices that simultaneously reduces the risk that allowance prices will spike too high while reducing the risk that prices will fall too precipitously. The approach — called the Allowance Price Containment Reserve (APCR) — requires CARB to withhold 4 % of

allowances in a reserve account that can be used if allowance prices spike too high. CARB would sell the allowances that are reserved if allowance prices spike above a set price — in the first phase, above $40 per allowance, in the second phase above $45 and so forth. The additional allowances sold out of the APCR at a previously-established price should keep allowance prices around this "ceiling" and reduce upward pressure on allowance prices.

If, instead, allowance prices stay in the range predicted, the allowances included in the Allowance Price Containment Reserve are never sold, with the result that emissions are reduced even further than the imposed cap. By withholding the allowances, then, the APCR has the effect of maintaining allowance prices at a higher level than they would otherwise be. This effect should, in turn, spur innovation. As explained in an influential Resources for the Future report that introduced the idea of allowance reserves, "allowance reserves can … anchor initial [allowance] prices near or below the ceiling price." That anchoring means that prices will remain relatively stable and high enough to promote the kind of innovation cap-and-trade is designed to achieve.

I have argued previously that California's efforts on cap-and-trade are important not only in an absolute sense but also because ,if successful, the state can demonstrate to the rest of the country — indeed the world — that emissions can be reduced at a reasonable price while spurring innovation. The careful design of its program, with mechanisms like an increasingly stringent cap and the APCR, gives me optimism that the state will be able to show precisely that.