

## Green Gold Rush or Green Bubble?

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### *Introduction*

Renewable energy assets have been on a roller coaster for a while. Clean energy stocks' prices took a beating along with most of the rest of the market in 2008. The WilderHill New Energy Global Innovation Index, or NEX, dropped 61 percent in 2008, and slid another 17 percent as of February 23, dropping precipitously following the recent signing of the American Economic and Reinvestment Act of 2009 (referred to in most news coverage as the "stimulus package").<sup>25</sup> Energy research firm New Energy Finance reports that new investment in clean energy rose 4.4 percent in 2008, led by infrastructure investment and followed by private equity and venture capital investment. The increase was minimal compared to the 60 percent compound gains in 2006 and 2007; moreover, all of 2008's growth was front-loaded—new investment in clean energy in the second half of 2008 decreased by 23 percent compared to the second half of 2007.<sup>26</sup> Even though clean tech received a boost from the stimulus package,<sup>27</sup> the outlook for investments in renewables remains unclear. Some investors express great, almost messianic, confidence in the sector, while others remain bearish. Why is there so much uncertainty about the future of clean tech?

Investment in renewables has been a small, though growing, piece of total investment in the energy sector. In 2007, \$84.5 billion of new money was invested in clean energy infrastructure, representing less than 10 percent of estimated global investment in energy infrastructure during that year, according to a report by the United Nations (UN) Environment Programme and New Energy Finance.<sup>28</sup> That statistic reached \$96.6 billion in 2008, and was the biggest driver of new clean energy investment last year.<sup>29</sup>

The relatively modest investment activity to date is attributed by industry insiders to the untested nature of some of the new technology, the difficulty of scaling new renewable technology for larger projects, continuing uncertainty over the future of federal and state subsidies, prevailing credit market conditions, and even concerns, in some corners, that the renewables sector may be the next bubble to burst.

However, the stimulus package, as finally adopted, as well as President Obama's energy plan, includes substantial allocations for clean energy, research and development (R&D) and other related investment. And while there is substantial governmental support for these sorts of investments in the stimulus package, the package anticipates that the developers of the new clean energy infrastructure will be private investors rather than the government. The pace of investment in this area is expected to increase because many private equity and other investors will want to take advantage of the impending legislative and regulatory frameworks that will spur investments in this area. This article describes some of the drivers and challenges relating to such investments, and highlights some of the significant investment activity to date. It concludes with observations on what may shape future investment activity in this sector.

### *Drivers*

Demand for renewable energy has been driven up by economic factors, tax policies, concerns about climate change and new state laws imposing mandatory use of renewable energy sources on power producers. The principal economic driver through the summer of 2008 is well known—the increased cost of fossil fuels due to rising global demand, global turmoil and increasing production costs. Now, the volatility of fossil energy prices and the expected financial and legal

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costs associated with complying with a greenhouse gas (GHG) emissions cap-and-trade regime and the provisions of the stimulus package seem likely to continue to drive the appeal of renewable energy.

### *Challenges*

#### *Legislative and Regulatory Uncertainty*

The technology supporting renewable energy generation is new, rapidly changing and sometimes untested. Much of it is not likely to be economically competitive with traditional sources in the short term without some sort of governmental support during this developmental phase. Investment in green assets has been inhibited by an absence of comprehensive legislation and related rulemaking, and by the complex turf wars between different federal agencies and commissions, between state and local governments and between the states and the federal government. The stimulus bill contains substantial money for R&D, funding of a loan guarantee program and a variety of tax benefits. However, the stimulus bill does not, for the most part, address the greater challenges of harmonizing regulations and competing agencies or minimizing the tug-of-war between state and federal regulators.

#### *Federal Activity*

For an example of the tug-of-war between state and federal entities, consider the renewable portfolio standard (RPS), a requirement that utilities procure a minimum percentage of the power sold to end users from renewable sources. More than half the states have instituted some sort of requirement regarding an RPS, though the ambitiousness of such requirements varies among those states. Legislation proposing federal RPSs has been debated several times in the recent past, but to date has not been introduced into law.<sup>30</sup> Movement on a national energy policy may happen later this year, however, when some expect Congress to enact legislation in support of the Obama energy plan, which proposes a nationwide RPS of 10 percent by 2012 and 25 percent by 2025. Similarly, several states have implemented or are studying some sort of policy limiting carbon emissions by utilities—most notably, the Regional Greenhouse Gas Initiative (RGGI)—and the administration is now championing a 100 percent auctioned cap-and-trade program that would reduce carbon emissions by 80 percent by 2050.<sup>31</sup>

On the biofuel front, Congress continues to wrestle with the extent to which it will support ethanol and other biofuels. This has been complicated by the assertion that last year's rise in global food commodity prices was caused by the diversion of food crops and agricultural land to biofuel feedstock.<sup>32</sup> Congress did significantly expand the Renewable Fuels Standard (RFS) to 36 billion gallons by 2022 under the Energy Independence and Security Act of 2007 (EISA).<sup>33</sup> Congress has also provided for continued funding and commissioned research regarding biofuels technologies (especially cellulosic) and their environmental impacts in both EISA and the Food, Conservation, and Energy Act of 2008 (FCEA),<sup>34</sup> and various programs in the stimulus package. The Department of Energy has indicated that it will favor ethanol programs that use non-food sources as feedstock—for example, in the loan guarantee program expanded under the stimulus package—but the rules have not been fully developed as of this time. Currently, several states have implemented varying minimum ethanol requirements, including feedstock requirements, in fuel sold within their borders.<sup>35</sup>

The Production Tax Credit (PTC) and Investment Tax Credit (ITC) are two other programs that have affected renewable energy development. There has been considerable uncertainty regarding both of these programs since their inception. The PTC, first established in 1992 by section 1916 of the Energy Policy Act of 1992,<sup>36</sup> has been allowed to expire and reinstated three times since then, has been extended an additional four times, and has been modified in size and

scope numerous times since inception.<sup>37</sup> Studies have shown that the uncertainty bred by such fits and starts has a significant negative impact on investment, particularly on wind investment, in the months leading up to an expiration of the credits prior to their renewal.<sup>38</sup> The latest extension was provided in the stimulus package, which extended the placed-in-service deadline for the PTC for wind projects through 2012 and for other renewable energy projects through 2013.<sup>39</sup> Although this extension is longer than the usual one- to two-year extensions Congress has given project developers in recent years, it has still not addressed the risk that investment will likely fall once again in three or four years as the next expirations loom. The ITC, which has largely benefited solar energy, has had a similar history of uncertainty and modification since its first inception under the Energy Tax Act of 1978.<sup>40</sup> Congress most recently modified and extended the ITC through 2016 via the Energy Improvement and Extension Act (EIEA) of 2008.<sup>41</sup>

Besides tackling investor uncertainty through the extension of the PTC, the stimulus package includes items to ensure that new developers of clean and renewable energy can claim credits sooner, by introducing an election to claim a 30 percent ITC, instead of the PTC, for projects placed in service in 2009 and 2010.<sup>42</sup> This effectively expands the scope of the ITC to cover all renewable energy projects that had previously only been assisted by the PTC. Furthermore, the stimulus package introduces an option to take a Treasury cash grant (virtually a refundable tax credit) in lieu of the ITC or the PTC.<sup>43</sup> This option would provide significant advantages for renewable energy investors in the short-term due to the virtual disappearance of the tax equity market, even though the grant would come with some strings. The stimulus package also expands the national annual limitations on two existing tax credit bond programs—the New Clean Renewable Energy Bonds and the Qualified Energy Conservation Bonds—for qualified issuers.<sup>44</sup> Additionally, it provides \$6 billion in funding to an expanded Department of Energy (DOE) federal loan guarantee program, and includes targeted appropriations for developing smart grid technology and upgrading and expanding the nation's electricity transmission grid.<sup>45</sup>

### *State Activity*

The Bush administration did not take leadership on climate change and related matters. In the absence of such leadership, many states adopted their own policies, either alone or as part of regional initiatives.

For example, as noted above, almost half the states and the District of Columbia have adopted some form of mandatory RPS.<sup>46</sup> Under these programs, power producers are obligated to produce a minimum percentage of the power sold through the grid from renewable sources, such as wind, solar and hydroelectric. Generally, the applicable percentage will ratchet up over time. Requirements vary widely from state to state, and, as noted below, in many states regulations are not yet final or the infrastructure needed to achieve these goals is not in place. Similarly, in some regions, states are voluntarily forming regional initiatives to introduce their own cap-and-trade policies, such as RGGI in the Northeast United States, which became mandatory on January 1, 2009.<sup>47</sup> At the residential level, several states have been providing varying tax credits to subsidize the cost of renewable energy installations, and some states and local governments have recently begun to implement leasing programs to further encourage individual consumers to install solar technology at their homes.<sup>48</sup> This patchwork of laws, standards and incentives creates complexity and uncertainty, which again can cause some reluctance to invest. The Obama energy plan described above, if implemented, may help cut across the cacophony, though the legislation necessary to implement these proposals is not expected until later this year. Energy investors will be eyeing Washington closely this year to see whether President Obama will be able to deliver on these plans for America's energy economy.

Already, and even before the stimulus, RPSs and other state and regional initiatives seemed likely to increase demand for renewable energy that traditional utilities may struggle to meet.

Further, as many states have tailored their standards to serve local businesses or objectives, such as Pennsylvania's support of coalbed methane,<sup>49</sup> they may prove popular at a local level and hence many are expected to continue even if federal programs are enacted in the future.

But though legislation has been enacted in these states, many of the rules implementing key aspects of these RPSs—such as what assets qualify—are not yet finalized, or are subject to change as the states continuously review the state of the energy market and how the programs work in practice. For example, New York State plans a comprehensive review of its RPS policies in 2009, with a view to transitioning the program to be more market-driven.<sup>50</sup> In addition, several states, including Maryland and Delaware, as well as the District of Columbia, have increased their RPS requirements by vast amounts in the past year and a half.<sup>51</sup> The relationship of state and federal legislation remains uncertain, and the market for renewable energy credits has not yet developed. As many of these uncertainties are due to legislative and regulatory shortfalls, there is some hope that they can be overcome if Congress and the new administration are able to work together to provide the necessary leadership from Washington.

### *Commercial Considerations*

Legislative and regulatory uncertainties are not the only investment challenges for renewable energy assets. For example, a more “ordinary course” hurdle is transmission constraints: new generation is useless if not connected to the grid by new power lines, and wind energy produced largely in sparsely populated regions must travel long distances to be used in more densely populated areas. Other issues are raised by the recent decline in the price of fossil fuel and the current recessionary environment. The recent volatility of fossil fuel prices creates uncertainty as to the long term competitiveness of renewable energy and may deter investments. Moreover, recessions historically lead to softer demand for energy and could result in lower returns on energy assets. Finally, the current unstable credit market and the complexity of applying a historical leveraged model to energy assets are further impediments to making renewable energy investment a darling of the private equity community.

### *Current Activity and the Market Players*

Notwithstanding the uncertainties and in spite of the challenges, investors in general and a few private equity firms in particular have been moving into the renewable energy sector over the past several years, enticed by strengthening economics, high oil prices, public incentives and, in some cases, a desire for more “green” projects in a portfolio. Others have been attracted to the prospect of being at the forefront of a movement that may vastly change global industry. But, in recent months the outlook for the renewable sector has become cloudy. The prospects for the sector have deteriorated as a result of the severe U.S. economic crisis, with the associated lower levels of energy demand, the credit crunch (which makes it very difficult to finance projects and acquisitions), the reduced availability of sources of tax equity financing as a result of the Wall Street meltdown, and, last but not least, the impact of lower oil prices. On the other hand, the green agenda of the Obama administration provides some cushion from all of these difficulties as is already apparent in the stimulus package. Yet it remains to be seen how different market players will react to the combined effect of this complex set of variables.

### *Strategics*

Setting aside pure-play green Independent Power Producers (IPPs), such as Renegy Holdings, Inc., the more interesting question is how utilities and diversified IPPs will react to the new environment. Until recently, renewable investment in the U.S. seemed more likely to be made by IPPs and developers than regulated utilities. As risks associated with carbon-intensive energy generation have increased over the past several years, however, utilities are increasingly seeing

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renewable energy as complementary to their existing portfolio of assets.<sup>52</sup> The new and increasing RPSs, the newly-available ITC and other legislation favoring clean energy should make further investments by utilities in the sector even more appealing. In Europe, the large utilities have made massive investments in renewables—no doubt spurred by EU-mandated portfolio targets—with varying degrees of enthusiasm depending on the utilities' jurisdiction. For instance, German utilities are at the forefront, given that the country has been a leader in promoting and mandating use of clean energy.<sup>53</sup> Transmission owners and operators are also moving to address transmission constraints facing current state and potential national RPSs. In two major announcements in February, a Midwest ISO-led consortium of Midwest and Eastern transmission companies released a study showing \$80 billion in additional transmission is needed to deliver 20 percent of the energy consumed in the Eastern region of the U.S. from wind,<sup>54</sup> and ITC Holdings Corp., a Michigan transmission operator, proposed building (if it receives regulatory approval) a \$10 to 12 billion "Green Power Express," comprising 3,000 miles of new lines capable of bringing 12,000 megawatts of power from windier areas such as the Dakotas and Iowa to metropolitan areas in the Midwest.<sup>55</sup>

Energy industry and technology corporations are also making direct equity investments in green and clean technology, spanning from minority stakes to vertically integrated partnerships. Announcements in the past 12 months here in the U.S. include Google's pledge to invest hundreds of millions of dollars in renewable energy, and more recently to conduct policy work on smart grid development and testing of its new software tool that would allow consumers to measure home electricity use in real time.<sup>56</sup> In addition, General Motors has announced partnerships with advanced technology ethanol companies Coskata Partners and Mascoma Corporation.<sup>57</sup> Chevron, Shell and BP have also invested in biofuels companies and R&D.<sup>58</sup>

#### *Venture Capital Firms and Hedge Funds*

Venture capital firms, which are particularly well-suited to the development stage of new technologies, have also been active in the sector over the past several years. Venture capital funding for the green and clean industries during 2008 increased to \$4.7 billion, a whopping 68 percent increase in annual capital invested and a 5 percent increase in annual financing activity over 2007, according to an Ernst & Young LLP analysis based on data from Dow Jones Venture Source.<sup>59</sup> This statistic seems particularly remarkable given the state of the credit markets in 2008, although Ernst & Young noted in its press release that investment dropped from \$1.7 billion in the third quarter to \$954 million in the fourth quarter. Until recently, hedge funds were in the mix as well through equity- and convertible-debt private placements, and by building up positions in publicly-traded securities. The amount of money raised for green investments grew at a rapid pace, highlighted by the support of high-profile fund managers like T. Boone Pickens. According to a report published by the UN Environment Programme and New Energy Finance, as of March 2008 there was \$67.3 billion under management by Venture Capital funds, hedge funds, institutional investment funds, private equity funds and other investment funds focused on investment opportunities in clean energy—almost four times the same statistic in March 2007.<sup>60</sup> It remains to be seen how these players will react to the new circumstances: will there be enough in the stimulus bill to overcome the economic challenges that investors in the sector will face?

#### *Private Equity*

Private equity players have moved into this area during the past few years. Several prominent firms have raised funds dedicated to clean energy, renewables, energy infrastructure and generation, and we know that many other funds are in the early formation stages. New Energy Finance reports that, in 2008, private equity poured \$7.4 billion into the industry in the form of expansion capital, almost twice 2007's figure of \$3.8 billion, although investment dropped off significantly in the fourth quarter amidst the global market downturn.<sup>61</sup> First Reserve, an energy-

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focused fund, was one of the leading private equity investors that contributed to high second quarter growth with four major deals announced during the period. The fund publicized over \$1.2 billion committed to clean energy investments as of May 2008, and has said it intends to eventually devote up to 15 percent of its funds to that sector.<sup>62</sup> Private equity investment did not completely halt in the fourth quarter despite the difficult economic situation—Riverside Partners LLC announced on October 14, 2008, the completion of its acquisition of Solar Works, Inc. and SolarWrights, Inc., which the fund combined to form what it calls the largest solar energy integrator in the Northeast U.S.<sup>63</sup> New Energy Finance reported that aggregate new investment in clean energy companies by private equity and venture capital firms in 2008 exceeded 2007 levels by 33 percent, high when compared to the far more modest increase of 5 percent reported for total new clean energy investment amidst this year's global financial woes.<sup>64</sup>

Some private equity players have entered the space through joint ventures with others who have more experience in the industry. For example, the Carlyle Group teamed up with its long-time partner Riverstone Holdings LLC in 2006 to form and co-manage the Carlyle/Riverstone Renewable Energy Infrastructure Fund.<sup>65</sup> At the beginning of 2008, Riverstone and the IPP AES Corporation announced a partnership to invest up to \$1 billion globally in solar energy projects through a new entity, AES Solar, which in turn participated in a \$300 million equity financing of thin-film solar panel producer Nanosolar, Inc.<sup>66</sup> Goldman Sachs Group Inc. and CDH Investments also teamed up to invest about \$100 million in Himin Solar Energy Group Co., a Chinese solar water heater manufacturer, and Credit Suisse announced it would invest \$300 million in the space through private equity firm Hudson Clean Energy Partners.<sup>67</sup> Again, whether private equity players will continue to invest in the sector with the same enthusiasm of the past few years is a question that may well depend on the legislative framework developing in Washington.

#### *What's Next?*

Investors that plan to invest in the sector expect that over the next couple of years we will witness a fundamental paradigm shift in the legal framework. Following the economic incentives in the stimulus plan, there will probably be an energy act that may include a national RPS and perhaps a coherent plan to upgrade the transmission infrastructure. Eventually, there may be climate change legislation that could be a game changer for the sector. Other factors that make investments in renewable assets uncertain are likely to be addressed in the next few years. The technology is improving and maturing rapidly. At some point, the credit markets will thaw and new tax equity players will emerge. Still, a fundamental question for investors that believe in the sector is whether to wait until some of these issues are sorted out or to jump in now while prices are depressed.

Other investors believe that we are in the middle of a "green bubble": assets are being bought and sold on uncertain premises and unclear prospects. Changes in regulation or tax laws, further declines in oil prices or continued economic downturn and declining energy demand could make these projects less economic. These investors say it will be better to wait, see how the dust settles and then pickup the more attractive survivors as part of a roll-up of a maturing sector. It is hard to tell who has the better investment thesis or crystal ball. What seems clear, though, is that renewable energy plays are here to stay.

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- <sup>5</sup> See *A Year of Two Halves*, *supra* note 2; see also New Energy Finance, *Global Trends in Clean Energy Investment, Journalist Fact-Pack - WEF Meeting: Davos, January 2009* (Jan. 28, 2009) [*hereinafter* NEF Fact-Pack], available at <http://www.newenergymatters.com/?p=about&n=13>.
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- <sup>11</sup> See U.S. Dept. of Energy, Energy Efficiency and Renewable Energy, State Energy Program, State Energy Office Project Briefs, at [http://apps1.eere.energy.gov/state\\_energy\\_program/project\\_briefs\\_state.cfm](http://apps1.eere.energy.gov/state_energy_program/project_briefs_state.cfm) (last visited on Feb. 25, 2009).
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- <sup>13</sup> See CRS Report RL34162, *Renewable Energy: Background and Issues for the 110th Congress* (updated Oct. 5, 2007) [*hereinafter* CRS October 2007 Report], available at <http://ncseonline.org/NLE/CRSreports/07Oct/RL34162.pdf>; Energy Improvement and Extension Act of 2008 [*hereinafter* EIEA], Pub. L. No. 110-343, Div. B (2008); *Stimulus Package*, *supra* note 3.
- <sup>14</sup> See CRS October 2007 Report, *supra* note 10.
- <sup>15</sup> *Stimulus Package*, *supra* note 3 at § 1101.
- <sup>16</sup> See CRS October 2007 Report, *supra* note 13; Energy Tax Act of 1978, Pub. L. No. 95-618, 92 Stat. 3174 (1978).
- <sup>17</sup> EIEA, *supra* note 13.
- <sup>18</sup> *Stimulus Package*, *supra* note 3, at § 1102.
- <sup>19</sup> See *id.* §§ 1104, 1603.
- <sup>20</sup> See *id.* §§ 1111-1112.
- <sup>21</sup> See *id.*
- <sup>22</sup> U.S. Dept. of Energy, Energy Efficiency and Renewable Energy, State Activities and Partnerships, *States with Renewable Portfolio Standards*, [http://apps1.eere.energy.gov/states/maps/renewable\\_portfolio\\_states.cfm](http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm) (last visited Feb. 25, 2009).
- <sup>23</sup> See Regional Greenhouse Gas Initiative (RGGI), *History*, <http://www.rggi.org/about/history> (last visited Feb. 26, 2009).

<sup>24</sup> Charles W. Thurston, *More State, County, City Governments Expected to Offer Residential Financing*, RenewableEnergyWorld.com (Oct. 17, 2008), <http://www.renewableenergyworld.com/rea/news/story?id=53874> (last visited Feb. 25, 2009).

<sup>25</sup> See Alternative Energy Portfolio Standards Act, 2004 Pa. Laws No. 213, S.B. 1030; see also Energy Justice Network, *Promoting Green Energy: The Free Market Approach vs. The Public Policy Approach*, <http://www.energyjustice.net/rps/> (last visited Feb. 25, 2009).

<sup>26</sup> See N.Y. State Energy Research and Development Authority, *About New York's Renewable Portfolio Standard: A Clean, Green Tomorrow Starts Today*, <http://www.nyserda.org/rps/about.asp> (last visited Feb. 25, 2009).

<sup>27</sup> An Act to Amend the Delaware Code to Increase the Renewable Energy Portfolio Standard, 76 Del. Laws 165 (De. 2007) (increasing the required RPS from 10 percent to 20 percent of electricity by 2009); An Act concerning Renewable Portfolio Standard Percentage Requirements—Acceleration, 2008 Md. Laws ch. 126, H.B. 375 (Md. 2008) (increasing the RPS from Tier 1 resources from 9.5 percent to 20 percent by 2022, and accelerating the compliance schedule); Clean and Affordable Energy Act of 2008, Act No. 17-508 (D.C. 2008) (doubling RPS from Tier 1 resources to 20 percent by 2020).

<sup>28</sup> See, e.g., Roland Rechtsteiner, Bob Kopech and Paul Kunkel, *Tilting at Windmills: Managing Uncertainty in Renewable Energy Investments*, Oliver Wyman Journal (Fall 2008), available at <http://www.oliverwyman.com/ow/8866.htm>.

<sup>29</sup> See, e.g., *id.*; Erfurt and Wolfen, *German lessons*, The Economist (Apr. 3, 2008), available at [http://www.economist.com/business/displaystory.cfm?story\\_id=10961890](http://www.economist.com/business/displaystory.cfm?story_id=10961890).

<sup>30</sup> See Press Release, Midwest ISO, *Study: Billions Needed to Deliver Wind Power to Eastern Interconnection* (Feb. 9, 2009), available at [http://www.midwestiso.org/publish/Document/20b78d\\_11ef44fc9c0\\_-7c4b0a48324a/2009-02-09%20JCSP%20Study%20Quantifies%20Cost%20of%20Delivering%20Wind%20NR.pdf?action=download&property=Attachment](http://www.midwestiso.org/publish/Document/20b78d_11ef44fc9c0_-7c4b0a48324a/2009-02-09%20JCSP%20Study%20Quantifies%20Cost%20of%20Delivering%20Wind%20NR.pdf?action=download&property=Attachment).

<sup>31</sup> See Press Release, ITC Holdings Corp., *ITC Holdings Corp. Unveils Green Power Express* (Feb. 9, 2009), available at <http://investor.itc-holdings.com/releasedetail.cfm?ReleaseID=364150>.

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<sup>37</sup> See NEF Fact-Pack, *supra* note 5; Global Trends Report, *supra* note 4, Dataset, available at [http://sefi.unep.org/fileadmin/media/sefi/docs/publications/data\\_2008.pdf](http://sefi.unep.org/fileadmin/media/sefi/docs/publications/data_2008.pdf).

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