

# GREENPEACE COMMENTS ON THE ADB DRAFT ENERGY STRATEGY

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Despite its lofty goals, the draft ADB energy strategy raises a number of serious concerns. This is more than unfortunate given the increasingly deadly climate impacts that are projected to visit the region of Asia and the Pacific.

Given the magnitude of the crisis that the region will face without decisive global action on the part of governments and institutions alike, the ADB's entry in the climate solutions arena will be most welcome only if it can show both vision and leadership in redirecting the energy sector towards real, sustainable energy solutions.

Sadly, however, not only does the ADB's draft strategy fail to measure up to the said challenge. If implemented as it is currently written, the draft paper may actually amplify the economic and environmental vulnerabilities of the region.

As the energy strategy states, the ADB will focus on addressing the challenges faced by the energy sector today: "meeting energy security and transition to a low carbon economy toward achieving the ADB's overarching poverty reduction objective. The strategy will build upon three key pillars: (i) meeting the energy demand in a sustainable way, (ii) providing modern energy access to all, and (iii) addressing sector reforms and governance." (P.5)

Unfortunately, despite sectoral information and country experiences that should have been available to the ADB, the draft is plagued with defective assumptions, shoddy research and poor analysis. Most serious of all, however, is the absence of yardsticks by which the ADB, its developing member countries (DMCs) and other stakeholders can measure the level of success that its new strategy has attained.

There are no timetables and targets in the draft -- no benchmarks for financing, for instance -- that will show how the ADB intends to deploy its resources and whether it has done so wisely and in pursuit of its stated aims, and whether the bank has reached its goals. This is a fundamental flaw in the draft.

In fairness to the draft's writing team, the ADB energy paper has sections of merit. For instance:

- Compared to the standing 1995 ADB Energy Policy, the current draft contains more explicit and detailed reference to the increased risks to developing Asia due to climatic impacts. The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change was used to demonstrate the development of scientific certainties and the kind of cuts that may be required in order to avoid catastrophic climate change. Point 9 (p. 11), for instance, is a demonstration of the draft's awareness of recent climatic developments. It discusses the gravity of climate impacts in a manner that is more detailed and knowledgeable compared to 1995 Energy Policy and Energy Review 2000 issuances.

Although the section references the AR4, unfortunately the draft appears to avoid discussions of emission thresholds and temperature limits, particularly those that identify the 2-degree threshold and the corresponding impacts specific to Asia. A real discussion that identifies scientifically determined thresholds and pathways that steer away from such limits could have provided impetus to the crafting of timetables and scales of action that Asia and the Pacific could contribute.

- Another item in the paper that deserves to be roundly support is its explicit reiteration of the ADB's 1995 Energy Policy's position not to support nuclear projects. The nuclear section in the draft (p. 27) should be commended, despite its less than rigorous assessment.: "However, due to concerns related to nuclear technology, procurement limitations, proliferation risks, fuel availability, and environmental and safety concerns, ADB will maintain its current policy of non-involvement in the financing of nuclear power generation." (Point 61)

Unfortunately, we cannot point to other noteworthy sections in the paper that are not contradicted in one part or another of the document by what appears to be a muddled understanding not just of the role and capability of the ADB in leading energy solutions in the region but also of the role and capacity of the sustainable energy industry in contributing significantly to both climate protection and reaching the development goals of the bank's DMCs.

We considered adding to the positive list the draft's comment on extractive operations and mine-to-mouth coal, where interestingly the "ADB's commitment to clean and renewable energy" is implied as a counter-position as to why the ADB should not go into extractives support. This is the only section, however, where the argument has been used in this way, which is unfortunate and contradictory because the logic can also be used appropriately elsewhere in the document but the ADB has chosen to apply it selectively only on the items it appears to favor, such as those that have to do with coal.

Here are other problematic aspects of the ADB Draft Energy Strategy:

1. **SHORTCUT?** As explained by the Regional Sustainable Development Department's (RSDD) director for transport, energy, and water division, the option to craft a strategy rather than a new policy constitutes a shortcut by the bank to put in place a strategy that would appear to reflect new conditions in the region. As explained a number of times to various civil society organizations, only ADB management will approve the document. It will not be scrutinized by the ADB Board, which will only be furnished a copy of the finished product, because getting board approval "would be too tedious and time consuming and complicated."<sup>1</sup> For such a supposedly important document, the reasons given make it appear that reasons of expediency was given greater weight than the requirements of intellectual rigor. The resulting draft somehow reflects such a process.

This may actually even make the RSDD's work more complicated, since the ADB has begun the formation of the ADB's Long Term Strategic Framework, which would presumably involve energy. What if the outcome of the LTSF clashes with the energy strategy approved by bank management? Which will have greater influence and weight? Will the RSDD re-craft again its strategy if there are substantive differences between its energy strategy and the LTSF? Or will the LTSF be made to fit the so far flawed strategic energy roadmap put together by the RSDD? As the draft energy paper recognizes, vast changes in the region and in the energy sector have taken place over the last twelve years, when the ADB's standing energy policy (1995) was approved. The need to bridge this gap and ensure the bank's relevance given new realities in the region cannot be addressed timidly or with token efforts, which is unfortunately what the RSDD's attitude so far conveys.

2. **DISPARAGING REAL SOLUTIONS:** The ADB draft correctly identifies the expected rise of coal use in Asia as a key threat to the economic and environmental wellbeing of the region due to the attendant emissions that will come with coal-based energy generation filling the projected increase in energy demand. However, for all the focus that the ADB paper appears to train on key energy solutions such as renewable energy (RE), the bank's paper ultimately ends up disparaging the option while proposing courses of action that would negate the contribution of RE in sustainable development. Instead, the bank's draft strategy anchors its main intervention on the fantasy of "clean and cheap" coal, framing mitigation options largely on supposedly "cleaner" technologies such as supercritical and ultrasupercritical boilers, integrated gasification combined

cycle (IGCC) technology and carbon capture and storage.

A simple way of illustrating the draft's preferences can be illustrated by the frequency of use of particular words: geothermal is mentioned 12 times. Wind, 70 times. Solar, 79. Renewable 103. Nuclear was mentioned 51 times while coal was mentioned 191 times. Natural gas and oil were not counted.

In the "Introduction" (p. 5), the ADB takes the rhetorical route, articulating how climate change is a major driver behind changes being considered by the ADB. The section uses welcome language describing how volatile fuel prices combined with energy security goals and climate impacts impose an "extra and disproportionate burden" on developing Asia. Such a frame -- such a clear link between problem and response-solution, however -- is not followed through in the main text of the document.

In truth, in the very first section, no mention is made at all of the phenomenal growth of the RE market due to industry maturity and the application of the right policies. Policy changes have driven the scale-up of the RE investments even as cost reductions and fossil fuel costs spiral upwards. While it is true that RE market growth is mentioned later in the document, when the draft fails to centrally place the rapid and huge commercial developments that have attended the RE sector in the very opening section of the draft -- distinctly titled "The Changing Context" -- it comes as little surprise that real energy solutions played a minor role throughout the ADB's draft energy paper. Even in the section "Energy For All", there is no preferential treatment of the RE option. (P. 33, paragraph 87)

3. **AVOIDING ROBUST POLICY CHANGES?** The ADB draft has avoided leveraging market, industry and policy literature produced in the last few years which demonstrate the phenomenal growth of the global renewables market, thereby neglecting to describe in detail not only the huge and growing RE market that the Asia-Pacific has yet to tap but also, more importantly, the policy drivers behind the global expansion and growth of the RE market. As such, the ADB draft has little to contribute to the policy changes that must take place in developing Asia with regard to RE specific issues such as tariffs, rate structures, regulatory issues, implicit and explicit subsidies, real-cost/least-cost accounting processes and incentives.

Large up-front costs of renewable electricity systems are one of the key barriers to greater market penetration but a number of programs friendly to renewables have been put to use over the years to address such hurdles. These are policies that the ADB have avoided to promote with even a fraction of the zeal that has marked its region-wide backing of debacle-ridden, cookie-cutter privatization schemes. One instrument involves feed-in tariffs where producers of electricity are given the right to feed renewable electricity into the public grid, receive a premium tariff per generated kilowatt hour that reflects the benefits of renewable electricity compared to power produced from fossil sources, and receive the premium tariff over a fixed period of time. But even the sections on RE policies appear biased, in fact, implying that RE-friendly policies can work only in some European countries by mentioning only Germany, Denmark and Spain without any discussion of India's policy initiatives or the renewable portfolio standard arena of Texas responsible for the rapid development of RE in the state (P. 57, paragraph 38) and how policy variations can be applied in other DMCs.

The ADB team which wrote the draft had the benefit of numerous, detailed, robust challenges from civil society way over a year before it was issued publicly but nary a comment or discussion on critical views and serious submissions have been made.

The ADB's Operations and Evaluation Division (OED) also conducted an evaluation of the ADB's energy sector performance around the same period that the Draft Energy Strategy was being

written. The OED's paper is actually a more robust and forthright document, which shows a far better understanding of practical difficulties prevailing in the region's energy sector and includes a number of recommendations as to how these hurdles could be surmounted. The OED document, while far from perfect, actually paints a clearer picture of the energy sector in Asia along with the Bank's role in exacerbating problems and where and how the ADB can play a better role.<sup>ii</sup> For instance, it states: the "level of ADB supported investment in energy efficiency was far below both the potential and the need, and lending for renewable energy accounted for only about 3% of the portfolio.... A similar conclusion applies to ADB efforts to reduce greenhouse gas emissions from the energy sector" -- which echoes the message issued by civil society organizations (CSOs) during the 40th AGM of the bank in Kyoto (P. 8 of the OED Review).

Another reflection of persistent CSO criticism: "[A]nalysis of alternatives in project identification and selection has been a shortcoming in ADB's operations." (P.17 of the OED Review).

And another: "One common lesson that emerges from power sector reforms is that they take many years, and in many case [sic], far longer than originally expected." (P.17 of the OED Review, point 11). This explains clearly the motivation by numerous stakeholders for the ADB to get the right RE and energy efficiency policies on the central discussion table of the ADB's DMCs as soon as it can. Because when exactly does the ADB intend to start? When the region has lost the climate battle?

In fact, the policy battle needs to begin first within the ADB, where rational recommendations have been made but which are also being ignored.

In page 10 of the OED Review is a key statement that cannot be found anywhere in the ADB's draft energy strategy: "From an engineering and project planning perspective, building capacity is simpler. However, correcting inefficiencies offers the potential for large financial returns and improved environmental outcomes. Improving energy efficiency by examining both demand side and supply side alternatives should be made the single highest priority in the updated energy strategy. Before investing in new energy generation capacity, all feasible efforts should be made to decrease the demand through energy efficiency initiatives and increases in system efficiencies."

This should be self-explanatory, but the poor quality of the ADB's draft cannot even explain much less replicate the OED's reference to "single highest priority" items given that it does not identify any priority -- any hierarchy of programs -- that it intends to support and allocate resources to.

Admitting its past mistakes and learning from them, combined with the OED's recommendation above, would mean real, measurable respite for the Thai people, for example. As a recently issued report in Thailand has shown, "even according to relatively conservative assessments of potential identified by numerous Government and World Bank Commissioned studies ... Thailand's potential for meeting its future growth in energy demand through a decentralized energy mix of energy efficiency, renewable energy and efficient combined heat and power generation is large enough to negate the need for the new non-committed centralized coal and gas generation capacity and hydropower imports specified in the government's power development plan."<sup>iii</sup>

But will the ADB's team of writers drafting the new energy strategy of the bank ever listen?

4. **DUBIOUS AND MEDIOCRE ASSERTIONS:** It is ironic how frequently energy solutions are disparaged in the ADB's purported energy solutions draft. For instance: "RE lacks the reliability needed for grid operations until such time that energy storage devices, such as fuel cells, are commercially available. It is generally accepted that a grid can accept about 10% to 20% capacity from RE though a number of technical challenges hinder expanded use of RE in the grid. Renewable sources from sun, wind, tide and waves are currently not suitable to directly provide

either base load or peak load power when needed." (P. 21, paragraph 40)

This is a key item in any strategy paper that places a modicum of value on vision and application. The ADB fares badly on this section, constituting probably the worst if not at least one of the worst portions of the strategy.

First off, the reference the ADB used here is a discredited institution driven by dubious funding and doubtful motivation (to sell nuclear in Southeast Asia in order to keep the uranium prices high). The ADB's source for the quote is the Uranium Information Center based in Australia ('Nuclear Issues Briefing Paper 38, "Renewable Energy and Electricity. 2007). For more information on the UIC, see: <http://www.foe.org.au/campaigns/anti-nuclear/issues/mining/uic> and see: <http://www.uic.com.au/>

More substantively, however: the assertion on RE and the 20 percent renewable limit in the grid is nonsense, though a bit of a self-fulfilling prophecy if a grid has been bulked full with large coal and nuclear base load. Using base load-oriented engineers (such as the Australian uranium industry) will ensure that the ADB's understanding of the issue remains very poor. If large share of renewables load in the grid were a problem, the grid in Schleswig-Holstein, with 60 percent wind, or the local grid in Woking (UK) which reduced emissions by 77 percent with 99.85 percent decentralised energy (amongst which is over 40 percent renewables) would go bananas all the time - and they don't.

Here is a link that can help get the ADB draft strategy writing team up to speed:

<http://www.greenpeace.org.uk/blog/climate/decentralised-energy-w>

The ADB would actually do well to have an analysis done on the work done by WADE -- <http://www.localpower.org> -- and even put together a seminar on the basis of its feedback, which can help change the directions that needs changing.

The writers of the ADB strategy were likely educated to think only in terms of base load/peak load paradigms. There is little flexibility and it is akin to asking conventional foresters to come up with a plan for sustainable forestry. It won't work as they don't see the diversity of the approach of sustainable forestry. In a similar way, nuclear and coal-educated people don't see the diversity of the DE/EE/RE approach.

When talking about grid stability, there are a number of important issues to consider.

First, there is the base load/peak load notion. This notion is very much attached to the old way of thinking linked to big centralized electricity generation structures (such as large dams, coal fired thermal power plants and nuclear power plants). Because it is easier to manage big centralized units without computers and because big dams, large sea-bound or river-bound coal transports, or the possibility to avoid any transport of this rather bulky source, and the fact that nuclear power plants are incredibly expensive to build in a safe way, planners have become used to having extremely large generation units on centralized points in the grid and then planning around the power stations - all transport losses are taken as laws of nature.

In decentralized energy (DE) input management, one does not think in base load and peak load any longer, but rather in input and output-modeling depending on a lot more different factors. On the input side are factors such as weather patterns, heat-requirement patterns (because it is a large part of co-generation), the spread of capacity within the grid, and so on.

What one gets is modeling and management computer programs and installations that look very

much like what is already known on the demand side, where there are already for a long time a lot of different input factors taken up in the computer programs. For instance, weather patterns (when will people switch on their air conditioners, when will they turn on their heating), spreading of demand (industrial demand, household demand), up to things like TV program schedules (the famous football championship matches) and so on. These management programs always have been more complex than what the generation-oriented people have been using.

Another issue that plays a role is that of spread of sources. The German experience has already shown that a large amount of spread sources delivers an inherent stability, because "the wind always blows somewhere". If you integrate RE into the grid, it should be done in a decentralized way - and most RE sources are decentralized anyway (with the exception of off-shore wind and large scale solar-thermal, which are more predictable).

It is true is that a certain storage capacity helps for difficult periods. But that is as true for the current centralized "base-load / peak-load" philosophy, as it is for a more decentralized approach.

Greenpeace Spain has calculated the provision of electricity around the clock for Spain by 2050 on a 100% renewables basis. It is practical; it can be done -- unlike the fantasy of CCS or IGCC providing coal solutions to largely coal-induced climate change. See Jose Luis Garcia Ortega and Alicia Cantero, 100% Renewables: A Renewable Electricity System for Mainland Spain and its Economic Feasibility -- Summary of Conclusions, Madrid (2007) Greenpeace<sup>i.v</sup>; also, Alicia Cantero and Jose Luis Garcia Ortega, 100% Renewables, Comparison of Costs -- Summary of Costs, Madrid (2007) Greenpeace<sup>v</sup>.

Greenpeace believes that especially in fast developing nations such as Thailand, the Philippines, Indonesia, China, India and others, decentralized energy (DE) and EE and RE approaches could work unexpected rapid changes, because in many cases the grid is not that far developed as in, say, Germany. Starting out more decentralized is, however, a big challenge for countries with centralized government structures, who prefer to be able to say: we lack 3000-MW, so let's build one nuclear and one coal block and the problem is solved. Or so they think.

What does the total silence of the ADB on this discussion say about the strategy that it is putting together for the future of the region?

- 5. POOR RESEARCH OR DELIBERATELY SKEWED DATA?** The neglect to reference available literature is one of the more serious flaws behind the poor quality of the ADB draft. Either the ADB draft avoids key industry reports altogether or it cites questionable sources particularly because of the prevalence of industry literature that would have made the ADB's energy paper more robust in its discussion of options available to its DMCs. For instance, the only time ADB draft references the European Wind Energy Association (EWEA) is in connection with a survey showing many Europeans favor wind power while many oppose nuclear options (P.50). But the draft altogether avoids the discussion of a report co-authored by EWEA that provides a blueprint to achieve 12 percent of the world's electricity from wind by the year 2020. The report shows why, with the right policy support, the technology has "the maturity, clout and global muscle to deliver deep cuts in CO2 while providing a hedge against fluctuating fossil fuel prices and reducing energy import dependence." In 2006, the Global Wind Energy Council (GWEC) released the Global Wind Energy Outlook report with Greenpeace. The report showed that wind can provide 29 percent of global electricity by 2030 with the right policy support.<sup>vi</sup>

No mention of this is made at all in the ADB draft -- an omission that cannot be considered trivial. GWEC is comprised of the leading global, regional and continental associations which represent the entire wind power community -- 99 percent of the world's installed wind power capacity. In addition to leading international wind energy companies and institutions involved in hardware

manufacture, project development, power generation, finance and consultancy. It is the voice of one of the most rapidly growing energy sectors today.<sup>vii</sup> (In 2006, global demand for wind power grew by 32 percent; wind turbine sales alone were valued at over US \$23 billion).

The Energy [R]evolution report released this year by the European Renewable Energy Council (EREC) and Greenpeace demonstrates that with the right policy support, 50 percent of emissions from the power sector could be halved by 2030 through a combination of energy efficiency (EE), which represents half of the effort, with combined heat and power and RE providing a quarter each of the solution, with RE delivering 70 percent of global electricity by 2050. The blueprint details the contribution that can come from East Asia, South Asia and China that, together with steep cuts from the developed world, can keep global temperatures below 2 degrees above preindustrial levels.<sup>viii</sup> The report constitutes a direct challenge to both the business-as-usual and friendlier-business-as-usual scenarios propounded by the International Energy Agency (IEA).

EREC is composed of many of the world's leading renewable energy companies, consulting firms and European RE industry associations that, like GWEC, carry considerable market and policy expertise. And yet, rather than engage or challenge the alternative pathways presented by EREC, the ADB has chosen to timorously sidestep the debate by avoiding reference to the initiatives of groups such as EREC, GWEC and EWEA, opting instead to rely on sources such as Wikipedia.

EREC calculates that fuel cost savings under a sustainable energy scenario can reach up to \$202 billion per year, which would dwarf the "extra global annual investment of \$22 billion in clean and renewable power plants on top of current expenditure." In addition, converting the \$250 billion in subsidies that coal and gas receive annually to sustainable renewables could more than cover the shift towards more efficiently run, renewable energy-powered economies.

But there is no discussion of this in the ADB's draft.

It is interesting to note that in the OED Review of the ADB's energy sector performance, the survey results regarding the competencies of ADB energy specialists shows low rankings for 'other renewables' (excluding hydropower). If competencies were already questionable to begin with, why did the writers of the draft energy paper avoid referencing actual reports issued by the RE industry? (P.136 of the OED Review)

6. **FIXATION ON COAL FICTION:** Throughout the ADB draft, there is persistent reference to coal as a key medicine for the carbon-afflicted world.<sup>ix</sup> The absurdity of the proposition should be obvious. Coal is a strategic option only for the shortsighted. In a carbon-constrained world, electricity costs are projected to rise as coal-fired emissions become increasingly regulated.

Coal plants today typically reach only up to 38-40 percent thermal efficiencies while improvements using even the most modern coal-fired power plants have demonstrated marginal results. More expensive coal-fired power stations utilizing supercritical and ultrasupercritical boilers can reach no higher than 50 percent efficiency while plants using fluidized bed systems fare worse. Even the few integrated combined cycle (IGCC) coal plants in pilot project stage, which are considered costlier than conventional coal technologies, are expected to improve coal combustion efficiencies of only up to 50 percent.

In the context of the need for retrofits, the draft explicitly suggests/opens the way for ADB support of carbon capture and storage (CCS) technologies. (P.25, paragraph 50) Promoting the option of CCS is actually even more problematic. Even setting aside the huge number of serious legal and environmental infirmities associated with CCS, the use of CCS will actually increase power generation costs between 40 to 80 percent. Between 10-40 percent more fossil fuel must also be burned when CCS is used just to achieve the same power output. CCS is also not expected to

begin commercially till 2020 (at the earliest), which means during the very period when huge emissions reductions are required CCS will not be relevant.

Is the ADB draft energy paper's belittling sustainable energy options and avoiding substantive discussions of massive shifts of resourcing to alternative energy pathways in order to support its reckless promotion of supposedly "clean and cheap coal"?

For more discussion of the CCS option,

<http://www.greenpeace.org/raw/content/international/press/reports/briefing-ccs-carbon-capture-storage.pdf> and <http://www.greenpeace.org/international/press/reports/technical-brifing-ccs>

7. **ABANDONING KEY 1995 ENERGY POLICY RECOMMENDATIONS:** The draft strategy does not explain what it has done with the key recommendations from the 1995 Energy Policy, which is still standing, particularly on the issue of external costs.

As the 1995 policy states, the ADB "will emphasize the need for DMCs to incorporate systematically environmental considerations as well as social considerations (such as resettlement and rehabilitation) and the associated costs and constraints in their energy planning models so that project costs adequately reflect the environmental and social costs.<sup>3</sup> While an ideal method of internalizing the external environment cost has not been found, several practical methods are in use."

This recommendation is unequivocal and yet there is not one mention in the draft energy strategy about external costs. Perhaps this is because the ADB has nothing to show in terms of progress or actual results in this field despite the twelve years that has passed? But if this is the case, it merely proves the longstanding critique of the ADB that it cannot and does not want to recognize in full candor its great shortcomings.

It is actually the OED which reiterates the 1995 recommendation when it stated in its review that the ADB must "Reflect environmental externalities in decision making in the energy sector." (P.62 of the OED Review, point 182)

If, arguably, a case could have been made in 1995 that ideal methods did not exist to calculate the externality costs of a power project, which refer to costs arising from the ecological and social impacts of a power project that are passed on (externalized) to taxpayers, it cannot hold true today when initiatives such as ExterneE of the European Commission, among other programs, have been in existence for some time. In fact, when used on a coal-fired power project that the ADB funded recently -- the BLCP coal plant in Map Ta Phut, Thailand -- the resultant external costs that in effect both the BLCP company and the ADB have imposed on Thai taxpayers reaches way over US\$1 billion each year.

When the ADB considers to finance a coal-fired power project in one of its DMCs, does it tell the government and the public the size of costs that they, not the company nor the ADB, will bear when the power plant becomes operational? Does it work with the host government to ensure that a real integrated resource planning (IRP) process is followed, one which evaluates the real costs of energy choices available to the DMC as opposed to simply going along with and promoting the lie of 'clean and cheap coal'? Unfortunately, the IRP process is mentioned sparsely, apparently limited to the context of demand load profiles and supply side additions. (p. 31, paragraph 75)

Twelve years should have been sufficient time to put to practice its recommendations on externality costs. Instead, the ADB has dropped it from its new strategy.

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<sup>i</sup> 26 February 2007 meeting at the ADB head office with the RSDD's Woonchong Um and Ajay Guha at the ADB attended by Red Constantino (Greenpeace), Daniel Mittler (Greenpeace) and Ronald Masayda (NGO Forum on the ADB).

<sup>ii</sup> <http://www.adb.org/Documents/SES/REG/SES-REG-2007-05/SES-REG-2007-05.pdf>

<sup>iii</sup> See <http://www.greenpeace.org/seasia/en/press/reports/decentralizing-thai-power-tow>

<sup>iv</sup> <http://www.greenpeace.org/raw/content/espana/reports/resumen-conclusiones-100-reno-3.pdf>

<sup>v</sup> <http://www.greenpeace.org/raw/content/espana/reports/resumen-costes-100-renovables.pdf>

<sup>vi</sup> <http://www.gwec.net/index.php?id=45>

<sup>vii</sup> See the 2006 report by the European Photovoltaic Industry Association and Greenpeace:

<http://www.epia.org/documents/SG3.pdf>

<sup>viii</sup> [http://www.erec-renewables.org/publications/EREC\\_publications.htm#roadmap](http://www.erec-renewables.org/publications/EREC_publications.htm#roadmap)

<sup>ix</sup> P.24, point 49 and p.32, paragraph 78, and p.33, paragraph 85, and p. 31, paragraph 76, for instance; the section on coal in pp. 72 and 73 no longer even mention the urgency to mitigate.