Today's Issues Readings for March 31, 2019

For this Sunday, March 31, the Today's Issues group will discuss two essays from the New York Review of Books.

From the March 31 issue, page 49, "The Contested Legacy of Muslim Spain"

From the April 4 issue, page 4 "A Future without Fossil Fuels?" a review of two books about a coming fossil fuel peak and the geopolitics of energy transformation.

The group meets in the parlor of the Religious Education Building next to the church at 9:30 on Sunday mornings. Please do the reading and join our lively discussion.

A copy of the readings follows:

The Contested Legacy of Muslim Spain
Robert Irwin MARCH 21, 2019 ISSUE
Kingdoms of Faith: A New History of Islamic Spain
by Brian A. Catlos
Basic Books, 482 pp., $35.00

De Agostini Picture Library/G. Dagli Orti/Bridgeman Images
Muhammad XII, also known as Boabdil, the last Muslim ruler of Granada, leaving the city in 1492 after its conquest by Ferdinand and Isabella; detail of an altarpiece in the Royal Chapel of the Cathedral of Granada, sixteenth century
The historiography of medieval Spain is an academic battleground on which historians and other intellectuals pick over elements of the country's past that might support one or another version of its national identity. The question of national identity became acute during and after the Spanish Civil War. In 1943 the medievalist Claudio Sánchez-Albornoz published España y el Islam, in which the Muslim occupation of the Iberian Peninsula was presented as a disaster: "Without Islam who can guess what our destiny might have been?" Sánchez-Albornoz identified strongly with what he saw as the specifically Christian and Castilian heritage of Spain. This version of Spanish history might have appealed to the royalists, Falangists, and fervent Catholics who were winning the civil war. Yet Sánchez-Albornoz not only spent the Franco years teaching in Argentina, he was also president of the council of the Spanish Republican government in exile, and his book was published in Buenos Aires.

It was another exile from Franco's Spain who produced an interpretation of Spanish history that celebrated just those elements in it that Sánchez-Albornoz regarded as his country's curse. After the civil war broke out, the cultural historian Américo Castro had taken teaching posts in America, and in 1948 his España en su historia: cristianos, moros y judíos was published in Argentina. This book emphasized the hybrid nature of medieval Spanish society and the enormous contributions made to its culture by Arabs, Berbers, and Jews. Castro used the term

convivencia to describe the peaceful coexistence that he argued was commonly, though not always, the leading feature of the Muslim and Christian regimes in medieval Spain.

The debate has continued into the post-Franco era. The Cuban-born scholar of medieval history María Rosa Menocal followed Castro in celebrating the Arab and Jewish contributions to Spanish history and culture.* “A thousand years ago on the Iberian Peninsula, an enlightened vision of Islam had created the most advanced culture in Europe,” she wrote in 2002. Menocal lamented the Christian Reconquista, but it was not, in her view, what brought an end to that utopia of high culture and tolerance. Instead, civil strife among Muslim warlords in the early eleventh century began the ruin of Andalusian civilization. Thereafter the invasion from Morocco of first the fanatical Almoravid Berbers and later the no less fanatical Almohad Berbers completed the ruin.

In The Myth of the Andalusian Paradise: Muslims, Christians, and Jews under Islamic Rule in Medieval Spain (2016), Darío Fernández-Morera took a less pollyannaish view of Muslim Spain, which he argued “was marked by religious and therefore cultural repression in all areas of life” (in the words of his book jacket). His argument is densely and polemically annotated, and Menocal’s writings do not feature in his bibliography. In Kingdoms of Faith: A New History of Islamic Spain, Brian Catlos, a historian at the University of Colorado, expertly navigates between these clashing interpretations and presents a balanced account of the Muslim occupation of Spain and its consequences.

Within a few decades of the death of the Prophet Muhammad in 632 AD, Arab armies occupied the Sassanian Persian Empire and much of the Byzantine Empire. Having invaded Byzantine Egypt in 639, the Arabs went on to occupy Berber North Africa. In 711 an army of Arab and Berber troops crossed the Strait of Gibraltar from Morocco and went on to conquer Visigothic Spain and then to invade southern France.

Those sweeping victories can be presented as the fruits of jihad, and Catlos does acknowledge that religion both strengthened the cohesion of the invading tribal armies and influenced the accounts of their victories in later chronicles. But he prefers to emphasize the warriors’ desire for loot, including church treasures, livestock, and slaves, as well as the prospect of fertile lands to settle on. Some of the Visigothic aristocracy, at odds with their king, assisted the advance of the Muslim armies. It is also likely that many of the Berber troops still had only the slightest grasp of Islam.

In France the Muslim advance was checked by their defeat at the hands of Charles Martel at the Battle of Poitiers in 732. In Decline and Fall of the Roman Empire Edward Gibbon famously speculated that, but for the victory of the Franks, the Muslims might have swept on to cross the English Channel: “Perhaps the interpretation of the Koran would now be taught in the schools of Oxford, and her pulpits might demonstrate to a circumcised people the sanctity and truth of the revelation of Mahomet.” By the end of the eighth century the Muslim territory in southern France, Septimania, had been lost to the Franks.

Though Muslim Spain, and particularly the Caliphate of Cordova, has sometimes been presented as a utopia of multiculturalism, Catlos argues that tolerance, which was in any case often strained to the breaking point, was the product of economic and political necessity. There were simply too many Christians and Jews in eighth-century Spain to be killed or expelled, and besides they were needed as artisans and agricultural laborers. Their acceptance was the result of countless local accommodations rather than an official decree.

The modern Arabic word for toleration is tasamuh, which may also signify indulgence, forbearance, or leniency. The primary medieval sense seems to have been “magnanimity,” rather than a readiness to be relaxed about the religious or political views of others. In considering the significance of religious affiliation in medieval Spain one has to dismiss from one’s mind analogies with modern fundamentalist Islam and revivalist Christianity. As Catlos puts it, when discussing the identity of Muslims who eventually found themselves living under Christian rule, “religion in this era was conceived of not so much as a matter of individual conscience as the legal community to which one belonged. A Muslim was someone who followed ‘the law of the Muslims.’” Very much the same had applied to Christians under Muslim rule. Though there was no attempt to force the conquered Christians to convert, by the ninth century large numbers had done so, headed by descendants of the old Visigothic aristocracy and leading townspeople. Other citizens followed their lead as they sought economic and social advantage.

In the eighth century, Cordova became the capital of al-Andalus, or Muslim Spain. The entire province was under the nominal rule of the Umayyad caliphs in Damascus, though in light of the distances involved the regional governors were effectively independent. In 750 the Umayyad Caliphate in the East was overthrown by the Abbasids, and members of the Umayyad family were hunted down and slaughtered. But one Umayyad prince escaped and made his way to North Africa. From there he reached Spain in 756 and established himself in Cordova as emir of the caliphate of al-Andalus.

The emirate prospered under a succession of Umayyad princes and enjoyed its heyday during the long reign of ‘Abd al-Rahman III (912–961). In 929 he declared himself caliph, thereby setting himself in opposition to the Sunni Abbasid caliph in Baghdad and the Shia Fatimid caliph in Cairo. Catlos presents a vivid if absurdly anachronistic picture of high life in Cordova: “The masculine culture of the Andalusia elite was ninth-century ‘gangsta’—a testosterone-driven, wine-fueled culture, revolving around bling, bros, and biyatches, of biting freestyle wordplay and conspicuous consumption.” Yet despite its wealth and swagger, it was nonetheless provincial, and its courtiers, poets, and scholars had everything to learn from what was going on in Abbasid Baghdad.

The arrival in Spain in 822 of Ziryab, a musician formerly employed by the Abbasid court in Baghdad, was a major event. He introduced the Cordovan elite to new modes of song, modifications to musical instruments, innovations in court ceremony, new styles of dress and

hair, innovations in cuisine and table etiquette, as well as an antiperspirant based on lead monoxide. He was such a Promethean figure that it is tempting to think of him as a mythical being, yet his career is well documented. Still, the stigma of Andalusian provinciality was hard to shake off. When, in the following century, the Cordovan court poet Ibn ‘Abd Rabbih produced Al-‘Iqd al-farid (The Unique Necklace), a compendium of the best prose and poetry from around the world, he included no examples by Andalusians, with the exception of some poetry of his own. As it turned out, the cultured elite in Baghdad did not think much of Ibn ‘Abd Rabbih’s verses. The vizier in Baghdad, Sahib ibn ‘Abbad, declared that the anthology was “nothing but our own merchandise sent back to us.”

After the death of the caliph Hakam II in 976 the succession passed to a sequence of ineffectual fainéants and child caliphs, and real power was exercised by al-Mansur, the hajib (chamberlain). He was a vigorous general who campaigned twice a year in Christian territory, but as Catlos observes, the “goal was not conquest, but to generate plunder, prevent the Christian kings from taking the political initiative, and cripple their rural economies.” Mansur’s campaigning was hardly a jihad, for there were numerous Christians serving as soldiers and guides in his army.

In the decades that followed al-Mansur’s death in 1002, the caliphate of Cordova fell apart. Its ruin was brought about not by Christian armies but by Berber regiments that contended for supremacy and loot. Ibn Hazm, the historian, theologian, and poet, wrote of the capital’s desolation:

I stood upon the ruins of our house, its traces wiped out, its signs erased, its familiar spots vanished. Decay had turned its cultivated bloom to sterile waste. In savagery after society, ugliness after beauty, wolves howled and devils played in the haunts of ghosts and dens of wild beasts that had once been luxurious and melodious.

Catlos devotes only a single paragraph to the life and writings of Ibn Hazm, in which he notes that Ibn Hazm produced an encyclopedic work, the Kitab al-fisal fi al-milal wa-al-ahwa’ wa-al-nihal (Book of the Distinctions in the Religions, Heresies, and Sects, also known as the Fisal), which compared ancient and modern religions, and that he also wrote a treatise on love, the Tawq al-hamama (Ring Collar of the Dove). Both are worth consulting. The Fisal was based on wide reading and was designed to demonstrate not only the falsehood of all religions other than Islam but also the wickedness and folly of those interpretations of Islam that differed from the strictly literalist one he espoused. He never accepted that Muslims who disagreed with him might do so in good faith. Rather, their disagreements were the willful and vain products of disobedience of God’s word. Though Ibn Hazm took enough interest in Christianity to denounce it, most Spanish Muslims did not bother. On the other hand, his Tawq al-hamama is a delightful book that can still be read with great pleasure today, dealing as it does with such matters as falling in love as the result of a dream, keeping one’s love a secret, amorous abjection in thrall to a beautiful slave girl, and dying from unfulfilled love.

Ibn Hazm's religious books were burned by his enemies and he was imprisoned several times. It is striking how often and how many books were burned in al-Andalus. Hakim II is reported to have assembled a library of 400,000 volumes in Cordova covering all subjects and drawing on Greek, Persian, and Indian wisdom, but al-Mansur, the power behind the throne of the last Umayyad caliphs, seeking to please religious scholars and jurists, had the library purged of books dealing with astrology, philosophy, and other sciences of the ancients, as well as other immoral subjects. The offending books were publicly burned. Later, in 1106 and again in 1143, treatises on theology and Sufism by the great Eastern thinker al-Ghazali were burned on the orders of the Almoravid Berbers. In 1195, the philosopher and leading critic of al-Ghazali, Ibn Rushd (known in Christendom as Averroes), saw his books burned on the orders of the Almohad Berber Abu Yusuf. In the fourteenth century the Sufi treatises composed by the statesman and polymath Ibn al-Khatib were burned in Spain before he was strangled in a North African prison cell.

As the caliphate fell apart, what was left of Muslim Spain was divided among overlords who were known collectively as taifa kings, or party kings. Even in their own time they did not enjoy a good reputation. According to one contemporary poet, they were "like pussycats, who puffing themselves up, / Imagine they can roar like lions." Catlos's no less damning verdict is that the kings were "strongmen who were not even strong." Yet the eleventh and twelfth centuries were a great age for philosophy, theology, and literature, and the political and military decline of the taifa principalities did not entail a cultural decline. Catlos's account of Andalusian literary culture in this period is brisk and less surefooted than his coverage of politics and society. About the increasing influence of Arabic literature on the development of European literature from the thirteenth century onward, he writes:

Now Arabo-Islamic epics, romances and folktales—many of South Asian or Persian origin—were translated, adapted, or otherwise made their way into popular literature. These included the Kalila wa-dimna, a collection of fables; Sindibad, or Sendebar, the tales of Sinbad the Sailor; the epic of Alexander the Great; and tales from The Thousand and One Nights. Popular and didactic literature of the era, such as Ramon Llull's Book of the Beasts (1280s) and The Tales of Count Lucanor, written in 1335 by Don Juan Manuel, a nephew of Alfonso X, were strongly influenced by these texts. In fact, Arabic literature transformed European fiction, both through the borrowing of narratives and through the appropriation of the literary device of the maqamat, or frame tale, the story-within-a-story—the same device used by Boccaccio in his Decameron and by Chaucer in The Canterbury Tales.

Only some of this is correct. Kalila wa-dimna, a collection of animal fables, did circulate in medieval Spain, and some of its stories were recycled in the Latin Disciplina Clericalis, a collection of Eastern fables put together in the early twelfth century by Petrus Alfonso, a Spanish Jew who had converted to Christianity. But Sindibad (or Sendebar) doesn't contain the tales of Sinbad the Sailor. It is a collection of moral tales, probably of Persian origin, in which a queen tells stories with the aim of securing the execution of the prince who has rebuffed her advances, but a wise vizier tells other stories designed to save the youth's life. The craft and

malice of women is a leading theme of the stories told by the rival narrators. A version of this story cycle certainly circulated in Spain in Latin and in Spanish, and an Arabic version was eventually added to printed versions of The Thousand and One Nights. There seems to be no evidence that the stories of Sinbad the Sailor circulated in medieval Spain. (At the beginning of the eighteenth century, Antoine Galland arbitrarily added the Sinbad stories to his French translation of The Thousand and One Nights, the first ever available in Europe.)

Spanish Chapel, Santa Maria Novella, Florence/Art Resource
The philosopher Ibn Rushd, also known as Averroes; detail of Andrea di Bonaiuto's The Triumph of Saint Thomas Aquinas, 1366–1367

Although stories from what eventually would form the corpus of The Thousand and One Nights, such as "The Ebony Horse" and "Abu'l-Husn and His Slave-girl Tawaddud," did circulate in medieval Spain, they appear to have done so as freestanding stories, and they do not appear in the oldest substantially surviving manuscript of the Nights, dating from the fifteenth century (which was the one Galland translated into French). Consequently the wonderfully intricate and playful Chinese-box structure of the original core stories of the Nights was probably quite unknown in medieval Spain. If one is looking for precedents for the framing of stories within a story, as found in Boccaccio or Chaucer, they may be discovered in Homer, Ovid, or Petronius's Satyricon.

Maqamat (plural; maqama singular) does not mean "frame tale." It translates literally as "standings" and refers to a peculiarly Arabic genre of fiction that features a series of performances by a wily and highly eloquent rogue in disguise who seeks to use rhetoric and literary allusion to scrounge money from his audience before making his escape. The best examples of the genre offer serious lessons in Koranic exegesis, grammar, lexicography, and rhetoric. Although the maqama genre cannot really be seen as an ancestor of the European frame tale, its resemblance to the Spanish picaresque novel as it evolved in the sixteenth and seventeenth centuries has often been noted by literary scholars.

In the late eleventh century, the taifa kingdoms were losing ground to the Christians. In 1085 Toledo fell to the Castilian Alfonso VI. The Spanish Muslims appealed to the Almoravids in Morocco for assistance, but, though the Almoravids won a great victory over the Christians at Zallaqa, in southwestern Spain, in 1086, they were later more successful in annexing taifa kingdoms than they were in resisting the Christian Reconquista. The presentation of the Almoravids as barbarous and fanatical puritans has long been one of the clichés of Spanish historiography. But Catlos argues that the "dour" image of them has been exaggerated and that they were important patrons of the religious sciences: study of the Koran, prophetic traditions, and religious law. If they had been important patrons of poetry rather than religion they would probably have received more favorable treatment by modern historians.

By the early twelfth century Almoravid control in the Maghreb was being undermined by yet another religiously inspired, puritanical Berber movement, that of the Almohads. In 1145 the

Almohad leader ‘Abd al-Mu’min, having taken over Almoravid Morocco, sent an army across the Straits and occupied most of what was left of Muslim Spain. In The Ornament of the World, María Rosa Menocal described the Almohads as “even more fanatic” and as “Islamic fundamentalists.” Catlos places less emphasis on Almohad ideology and argues that, though the Almohads did for a time strictly enforce discriminatory measures against Jews and Christians, sectarian attacks on non-Muslims were more likely to have had economic rather than religious motivations and, contrary to some reports, Jewish communities survived under Almohad rule. Moreover, despite the stern branch of Islam espoused by the Almohads, the great Muslim philosophers Ibn Tufayl and Ibn Rushd wrote under the patronage of the ruler Abu Ya’qub Yusuf (though Yusuf’s son briefly gave in to pressure from the religious elite to exile Ibn Rushd and have his books burned).

Slowly the Reconquista took on the quality of a crusade, with papal indulgences and the creation of crusading military orders. However, this Spanish crusade was punctuated by long intervals of peace, and Christian campaigning was often halted by Muslim offers of tribute. In 1212 Christians won a great victory against the Almohad army at the Battle of Las Navas de Tolosa. Though the Muslims were roundly defeated, this battle was not decisive, and the Almohads continued to win fights against the Christians. The problem for Islamic Spain’s survival was that, broadly speaking, the Almohads in Spain fought in observance of jihad and for plunder and glory, but they did not actually campaign to regain territory. They were more concerned with conserving their territory in North Africa. Yet colonization projects were an important part of the Christian Reconquista. Castile and Aragon encouraged immigration from the south of France, and military orders were organized not only to fight but also to cultivate the lands they occupied.

Cordova fell to the Christians in 1236, Valencia in 1238, and Seville in 1248. Eventually only the Nasrid Emirate of Granada remained in Muslim hands. It owed its survival in part to its numerous heavily fortified strongholds in the Sierra Nevada mountains. The late fourteenth century was its Indian summer, for this was when the spectacularly beautiful Court of the Myrtles and Court of the Lions were added to the Palace of the Alhambra. It was also when Lisan al-Din Ibn al-Khatib, the vizier of the Nasrid ruler Muhammad V, produced his Sufi treatise, as well as poetry, maqamat, letters, chronicles, a travel narrative, and a biographical dictionary.

Ibn al-Khatib was the last great chronicler of Muslim Spain, and so the history of subsequent Nasrid rulers of Granada is somewhat conjectural. It has to be constructed from Christian sources. For example, it is uncertain whether Muhammad X ever reigned, though Muhammad IX and Muhammad XI certainly did. For some time the Nasrid rulers managed to set one Christian kingdom against another and buy them off with tribute. But the marriage in 1469 of Ferdinand of Aragon and Isabella of Castile put an end to this tactic. The increasing effectiveness of cannon in siege warfare was no less damaging to the Nasrids. In 1492 Granada surrendered, and Muhammad XII, also known as Boabdil, handed over the keys of the Alhambra to the Catholic monarchs.

Muhammad XII had agreed to terms that included the free practice of the Muslim religion by his subjects, but those terms would not be honored. In 1499, Cisneros, the archbishop of Toledo, had five thousand books publicly burned in Granada. This sparked a series of rebellions in the countryside, and after they had been suppressed the defeated Muslims were forced to convert to Christianity or leave the country. But suspicions remained about those Muslims, known as Moriscos, or "little Moors," who had apparently converted, and in 1609 they too were forcibly expelled. In the long century that had preceded their expulsion, the Inquisition conducted a culture war against such detestable things as washing, the veil, the avoidance of pork, and writings in Arabic. In the sixteenth-century topographical compendium of marvels, Tuhfat al-muluk (Precious Gift of Kings), its Egyptian author, Ibn Zunbul, described meeting a Spanish Muslim who told him that all the Arabic manuscripts in Spain had been locked up in a house and that, if one put one's ear to the keyhole, one could hear the munching of bookworms feasting on Arabic literature.

Catlos has produced an excellent political history of al-Andalus. Still, he says, "no book can claim in good faith to be the 'definitive,' 'true,' or 'real' history of Islamic Spain; there are simply too many factors to account for and too many uncertainties clouding the past." This must be right. New sources may emerge, and certainly there are more Arabic sources on al-Andalus than have so far been properly studied. As Catlos is well aware, histories are written for their times, and each age poses its own questions about the past. It is hard not to read Kingdoms of Faith without reflecting on such contemporary matters as Spain's national and regional identities, multiculturalism, assimilation, and repatriation. It has been said that history is written by the victors, but when one looks at the historiography of medieval Spain one is struck by the readiness of so many modern historians to champion the "losers" and even to question what victory really meant.

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See "Culture in the Time of Tolerance: Al-Andalus as a Model for Our Time" (Occasional Papers, Yale Law School Other Scholarship, 2000) and The Ornament of the World: How Muslims, Jews, and Christians Created a Culture of Tolerance in Medieval Spain (Little, Brown, 2002). ↩---------

A Future Without Fossil Fuels?
Bill McKibben APRIL 4, 2019 ISSUE
2020 Vision: Why You Should See the Fossil Fuel Peak Coming
a report by Kingsmill Bond
41 pp., September 2018, available at carbontracker.org
A New World: The Geopolitics of the Energy Transformation
a report by the Global Commission on the Geopolitics of Energy Transformation
88 pp., January 2019, available at irena.org
Amos Coal Power Plant, Raymond City, West Virginia, 2004
Mitch Epstein/Sikkema Jenkins & Co.

Amos Coal Power Plant, Raymond City, West Virginia, 2004; photograph by Mitch Epstein from his ‘American Power’ series

“Kingsmill Bond” certainly sounds like a proper name for a City of London financial analyst. He looks the part, too: gray hair expertly trimmed, well-cut suit. He’s lived in Moscow and Hong Kong and worked for Deutsche Bank, the Russian financial firm Troika Dialog, and Citibank. He’s currently “new energy strategist” for a small British think tank called Carbon Tracker, and last fall he published a short paper called “2020 Vision: Why You Should See the Fossil Fuel Peak Coming.” It asks an interesting question: At what point does a new technology cause an existing industry to start losing significant value?

This may turn out to be the most important economic and political question of the first half of this century, and the answer might tell us much about our chances of getting through the climate crisis without completely destroying the planet. Based on earlier technological transitions—horses to cars, sails to steam, land lines to cell phones—it seems possible that the fossil fuel industry may begin to weaken much sooner than you’d think. The British-Venezuelan scholar Carlota Perez has observed that over a period of twenty years, trains made redundant a four-thousand-mile network of canals and dredged rivers across the UK: “The canal builders…fought hard and even finished a couple of major canals in the 1830s, but defeat was inevitable,” as it later was for American railroads (and horses) when they were replaced by trucks and cars.

Major technological transitions often take a while. The Czech-Canadian academic Vaclav Smil has pointed out that although James Watt developed the coal-powered steam engine in 1776, coal supplied less than 5 percent of the planet’s energy until 1840, and it didn’t reach 50 percent until 1900. But the economic effect of those transitions can happen much earlier, Bond writes, as soon as it becomes clear to investors that a new technology is accounting for all the growth in a particular sector.

Over the last decade, there has been a staggering fall in the price of solar and wind power, and of the lithium-ion batteries used to store energy. This has led to rapid expansion of these technologies, even though they are still used much less than fossil fuels: in 2017, for instance, sun and wind produced just 6 percent of the world’s electric supply, but they made up 45 percent of the growth in supply, and the cost of sun and wind power continues to fall by about 20 percent with each doubling of capacity. Bond’s analysis suggests that in the next few years, they will represent all the growth. We will then reach peak use of fossil fuels, not because we’re running out of them but because renewables will have become so cheap that anyone needing a new energy supply will likely turn to solar or wind power.

Bond writes that in the 2020s—probably the early 2020s—the demand for fossil fuels will stop growing. The turning point in such transitions “is typically the moment when the impact is felt in financial markets”—when stock prices tumble and never recover. Who is going to invest in an industry that is clearly destined to shrink? Though we’ll still be using lots of oil, its price should fall if it has to compete with the price of sunshine. Hence the huge investments in pipelines and

tankers and undersea exploration will be increasingly unrecoverable. Precisely how long it will take is impossible to predict, but the outcome seems clear.

This transition is already obvious in the coal markets. To understand, for example, why Peabody, the world's largest private-sector coal-mining company, went from being on Fortune's list of most admired companies in 2008 to bankrupt in 2016, consider its difficulties in expanding its market. India, until very recently, was expected to provide much of the growth for coal. As late as 2015, its coal use was expected to triple by 2030; the country was resisting global efforts like the Paris Accords to rein in its carbon emissions. But the price of renewable energy began to fall precipitously, and because India suffered from dire air pollution but has inexhaustible supplies of sunlight, its use of solar power started to increase dramatically.

"In 2017, the price in India of wind and solar power dropped 50 percent to $35–40 a megawatt hour," said Tim Buckley, who analyzes Australasia/South Asia for the Institute for Energy Economics and Financial Analysis. "Fifty percent in one year. And a zero inflation indexation for the next twenty-five years. Just amazing." This price drop occurred not because India subsidizes renewable energy (it doesn't), but because engineers did such a good job of making solar panels more efficient. The cost of power from a newly built coal plant using Indian coal is, by comparison, about $60 a megawatt hour. If you have to import the coal, the price of power is $70/megawatt hour. And solar's $40/megawatt hour price is guaranteed not to rise over the thirty-year life of the contract the suppliers sign—their bids are based on building and then running a facility for the life of the contract. No wonder that over the first nine months of 2018, India installed forty times more capacity for renewable than for coal-fired power.

Much the same is happening around the world. President Trump has spared no effort to help the coal industry, but more coal-fired power plants shut down during the first two years of his presidency than during President Obama's entire first term. American coal consumption fell 4 percent in 2018. In 2017 Kentucky's coal-mining museum installed solar panels on its roof in order to save $10,000 a year on electric costs.

And it's not just coal that's on the way out. Natural gas was supposed to be the planet's next big fuel source, since it produces less carbon than coal (although its production releases great clouds of methane, another potent greenhouse gas). While fracking has produced high volumes of natural gas—especially in the US, where it was pioneered—wells tend to dry out quickly, and despite enormous investment, the International Energy Agency estimates that between 2010 and 2014 the shale industry operated with negative cash flows of more than $200 billion.

Even "cheap" natural gas is now starting to look expensive compared to the combination of sun, wind, and batteries. In an essay for Vox, the energy reporter David Roberts listed all the natural gas plants—many of them designed to provide quick bursts of "peaking power" on heavy demand days—whose planned construction has been canceled in recent months, as utilities and banks began to figure out that over the projected forty-year life of a new plant, there was a good chance it would become an uncompetitive "stranded asset" producing pointlessly

expensive electricity. The chief executive of one US solar company said in January, “I can beat a gas peaker anywhere in the country today with a solar-plus-storage power plant. Who in their right mind today would build a new gas peaker? We are a factor of two cheaper.”

You get some sense of the future from the stunning fall of General Electric. “They were the world leader, the thought leader, the finance leader, the IT leader,” said Buckley. “And their share price is down 70 percent in the last two and a half years, in a market that’s up 50 percent. It’s a thermal power–reliant basket case.” That’s in large measure because manufacturing turbines for coal- and gas-fired power plants was a significant part of the company’s business; in 2015, it hugely expanded that capacity by buying its largest European competitor, Alstom. But then the bottom dropped out of the industry as proposed new generating plants couldn’t find financing. GE makes wind turbines, too, but that’s a lower-margin business with many more competitors. The fall in GE’s stock has meant “hundreds of billions of dollars of shareholder value reduction,” according to Buckley. Last June, after more than a century, General Electric was dropped from the Dow Industrial Index, replaced by a drugstore chain.

Oil was believed to be better protected than coal and gas from competition because cars have long needed liquid fuel to run. But electric cars are becoming affordable for more and more consumers. In 2017 only three million out of a worldwide total of 800 million cars were electric, but they accounted for 22 percent of the growth in global car sales. The world’s leading car companies have become convinced that electric vehicles will account for all the growth in demand by the early 2020s. That’s why, by January 2018, they had committed $90 billion to developing electric vehicles—and why, by 2017, Tesla was worth more than GM or Ford. And for every Tesla that rolls off the assembly line, Chinese manufacturers are producing five electric cars. Auto analysts are already warning consumers to think twice before buying a gas-powered car, since its resale value may fall dramatically over just the next three years.

The oil companies tell investors not to worry. In mid-February Exxon announced that it had found huge new deepwater oil deposits off the coast of Guyana, and that overall it planned to pump 25 percent more oil and gas in 2025 than it had in 2017, which, it claimed, would triple its profits. In September, OPEC released a report predicting higher oil demand due to increases in jet travel and the production of plastics, which are made from petrochemicals. Analysts like Bond are skeptical of such claims. Although oil has been the planet’s most important industry for over a century, over the last five years it’s been the slowest-growing sector of the stock market. Petrochemicals and jet fuel are indeed harder to replace with renewable energy, but they make up a relatively small part of the market for oil—even if demand for them grows, it can’t offset the losses in core uses like pumping gas for cars.

The recent history of European utilities may provide a more realistic preview of what will happen in the rest of the world. In the early years of this century the German government increased the pace of decarbonization, subsidizing solar and wind energy. As more and cheaper renewable supplies became available, the existing utilities were slow to react. They had built new gas plants to account for what they assumed would be rising demand, but solar and wind cut into

that demand, and the price of electricity began to fall. So far, European utilities have written down about $150 billion in stranded assets: fossil fuel installations that are no longer needed. “In the Netherlands, by the time the last three coal plants were turned on, their owners had already written them down by 70 percent,” said Buckley. And they’re scheduled to close by 2030.

One obvious question is why the fossil fuel companies don’t simply transform themselves into renewable energy companies and use the huge cash flows they still have to gain control of future markets. “They’re putting under ten percent of capital expenditures into renewables,” says Bond, which translates into about one percent of their balance sheets. As Exxon’s CEO recently told The Economist, “we have much higher expectations for the returns on the capital we invest” than sun and wind can provide. From their point of view, there’s some money to be made from putting up solar panels, but once they’re on the roof the sunshine is free. For corporations that made vast profits by selling their customers fuel every day for a century, that’s not an attractive business model.

Another important question is whether this transition will crash the world economy. Investors have money at risk, and not just in fossil fuel shares: a shift of this size will affect car companies, machinery companies, and many others. But as the climate activist and billionaire investor Tom Steyer has pointed out, most technological transitions damage existing industries without wrecking the economy because they create value even as they destroy it. “Look at the communications industry over the last two decades, as the Internet came of age,” Steyer said. “Some of the most valuable businesses on the planet that had been around for more than a century got decimated. I mean, Newsweek sold for a dollar. But a lot of new businesses got created that were worth more.”

And banks have had at least some warning to prepare for this enormous shift. In 2015 Mark Carney, the governor of the Bank of England, began issuing strident warnings about stranded fossil fuel assets, urging the banks he regulated to begin taking close account of their exposure. He gave a memorable speech on the trading floor of Lloyds of London, pointing out that if countries made serious efforts to meet climate targets, vast amounts of money spent on oil wells, pipelines, coal mines, and tankers would be written off. He had to issue the warnings, he said, because the normal time horizon for financiers was too short. “Once climate change becomes a defining issue for financial stability, it may already be too late,” he said, noting that “the exposure of UK investors, including insurance companies, to these shifts is potentially huge.” He urged them to start preparing for a lower-carbon world. Companies, he said, should “disclose not only what they are emitting today, but how they plan their transition to the net-zero world of the future.”

Carney’s warning—which reverberated out from the financial center of London—seems to have spurred a reevaluation of fossil fuel exposure by many big financial institutions. “The major banks are now addressing this risk, whereas three years ago they were asleep to it,” Buckley said. “Now in Australia all our banks have climate policy, where they didn’t three years ago. We

didn’t even have data.” A report in late February from the Institute for Energy Economics and Financial Analysis showed that since 2013 a hundred major banks had restricted coal lending or gotten out of the business altogether.1

Robert Rauschenberg's Earth Day, 1970
Robert Rauschenberg: Earth Day, 1970; from the exhibition ‘Nature’s Nation: American Art and Environment,’ on view at the Peabody Essex Museum, Salem, Massachusetts, through May 5. The catalog is published by the Princeton University Art Museum, which organized the exhibition.
A far more important question, of course, is whether the changes now underway will happen fast enough to alter our grim climatic future. Here, the answers are less positive. Scientists, conservative by nature, have routinely underestimated the pace of planetary disruption: the enormous melt now observed at the poles was not supposed to happen until late in the century, for instance, and the galloping pace of ocean acidification wasn’t even recognized as a threat two decades ago. That means that we have very little time to act—not enough, certainly, for business cycles to do the job alone. The latest report of the Intergovernmental Panel on Climate Change, released last autumn, laid out a strict timeline: we need to effectively halve our use of fossil fuels within a dozen years to prevent the worst damage, which is why activists and politicians have called for dramatic government interventions like the Green New Deal recently proposed by Representative Alexandria Ocasio-Cortez and her Democratic colleagues.2

Government action is required because, for one thing, there’s vast inertia in the energy system. Plants are built to last decades, and even if plants that use fossil fuels aren’t built today, banks will insist that existing ones operate long enough to pay back their investments. And in some parts of the world, fossil fuel expansion continues: China, for instance, is trying to close down its own coal-fired power plants because its cities are choked in smog, but Chinese companies are using their expertise to build coal-powered plants abroad. Buckley noted that the opportunities for bribes on colossal projects mean, among other things, that a number of developing countries may indeed continue down the fossil fuel path.

In countries like the US or Canada, the political power of the fossil fuel industry is still considerable. Barack Obama boasted to a Texas audience last year that during his administration the US had passed Russia and Saudi Arabia as the biggest producer of hydrocarbons; even the progressive Canadian prime minister Justin Trudeau recently spent billions in tax dollars to finance a pipeline designed to increase exports from the country’s environmentally ruinous tar sands.

That’s why the most important aspect of the decline of fossil fuel companies might be a corresponding decline in their political influence. The coal, oil, and gas industries have been the architects of the disinformation campaigns that kept us from responding earlier to scientists’ warnings about climate change, and they are using every trick they know to keep us from making a quick transition. History indicates that “the oil majors—and those who invest in

them—will…bribe and fund Trump-type candidates and use their money in any other way" to slow down change, Carlota Perez said.

But change is here. While engineers are doing their part by making renewable energy cheaper, activists are mounting efforts to weaken the companies directly, and there are some signs that the pressure is working. An effort that I helped launch beginning in 2012 to persuade universities and churches to divest their fossil fuel shares has spread rapidly and become the largest divestment campaign in history. Over the last five years, insurance companies and sovereign wealth funds have joined in, raising the total value of endowments and portfolios involved to over $8 trillion, and prompting Shell to declare the campaign a material risk to its future business. (Early last year, the governments of New York City and London pledged to divest their pension funds, and the entire nation of Ireland joined in midsummer.) Campaigns have also targeted banks like Wells Fargo and JP Morgan Chase to force them to stop supporting particular pipelines.

The bottom line is clear: to the degree that the fossil fuel industry is weakened by some combination of technological change and furious activism, the chances for serious change increase. If energy barons like the Koch Brothers and Exxon remain flush with cash, they can probably delay or undermine initiatives like the Green New Deal. But if their businesses are under strong pressure from a rapidly changing energy economy, polities around the world would be freer to take the steps that scientists insist are necessary with the speed required to prevent global catastrophe. Should these changes happen quickly, they could do more than save us from planetary peril.

"A New World," the January report on the geopolitics of energy transformation from the International Renewable Energy Agency (IRENA), is one of the most hopeful documents I've read in a long time: it points out that for the 80 percent of the world's population that lives in countries that are net importers of fossil fuels, the transition to renewable energy means the end of a crushing import burden. "The long-term consequences of a switch to renewables are very positive," said Bond, who helped write the report. "Fossil fuels are produced by a small number of companies and countries and the benefits flow to a small number of people. With solar and wind you get a lot more local jobs, a lot more local investment. You get a whole new geopolitics."

Take India, the poorest large nation on earth. It imports 80 percent of its oil and 40 percent of its gas, along with much of its coal. Currently that costs the country $240 billion a year; if, as its leaders hope, its economy grows 7 percent annually, that figure would double in a decade—which is economically unsustainable. "Renewables also offer developing economies an opportunity to leapfrog, not only fossil fuels, but, to some extent, the need for a centralized electricity grid," the IRENA report concludes.

Countries in Africa and South Asia have a golden opportunity to avoid expensive fixed investments in fossil fuels and centralized grids by adopting mini-grids and decentralized solar

and wind energy deployed off-grid—just as they jumped straight to mobile phones and obviated the need to lay expensive copper-wired telephone networks.

The changeover, of course, would be rocky. Beyond the effects on the global economy or on particular companies and their investors, countries like Russia or Saudi Arabia (and increasingly parts of the US) are essentially oil companies themselves. As these petro-states face a fall in the value of their only real asset, there is a risk of destabilization on a vast scale; in fact, it's possible that we're in the early stages of this process, with mischief and cruelty increasingly on display as countries with no other source of economic power struggle to maintain profits while they can. The worst damage will, as usual, be inflicted on the poorest oil producers: Kuwait might be able to manage the transition, but could Angola?

Yet overall the benefits would be immeasurable. Imagine a world in which the tortured politics of the Middle East weren't magnified in importance by the value of the hydrocarbons beneath its sands. And imagine a world in which the greatest driver of climate change—the unrelenting political power of the fossil-fuel industry—had begun to shrink. The question, of course, is whether we can reach that new world in time.

1
"Over 100 Global Financial Institutions Are Exiting Coal, With More to Come," February 27, 2019; available at IEEFA.org. ↩

2
See my "A Very Grim Forecast," The New York Review, November 22, 2018. ↩