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SPOROČILO KOMISIJE

Podpora električni energiji iz obnovljivih virov energije

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KAZALO

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(Besedilo velja za EGP)

1. UVOD

1.1. Razlogi za poročilo

Povečevanje deleža obnovljivih virov električne energije EU ima več jasnih prednosti, med temi so najpomembnejše:

– večja varnost dobave energije;

– večja konkurenčnost EU na trgu industrije tehnologije obnovljivih virov;

– zmanjšanje emisij toplogrednih plinov energetskega sektorja EU;

– zmanjšanje emisij onesnaževal na regionalni in lokalni ravni;

– izboljšanje ekonomskih in socialnih možnosti, zlasti na podeželju in v odmaknjenih regijah.

Po načrtih Evropske unije naj bi do leta 2010 obnovljivi viri zagotavljali 21 % električne energije (Priloga 1). Ta cilj je bil opredeljen v Direktivi 2001/77/ES[1] o spodbujanju proizvodnje električne energije iz obnovljivih virov energije na notranjem trgu električne energije, ki je postavila tudi ločene cilje za posamezne države članice. Direktiva dodatno določa, da države članice proizvajalcem obnovljivih virov zagotovijo boljši dostop do omrežja, poenostavijo postopke izdaje dovoljenj ter vzpostavijo sistem potrdil o izvoru.

Podpora javnosti uveljavitvi zelene elektrike na trgu električne energije je upravičena, saj zgoraj naštete prednosti niso (ali po so le delno) zajete v neto dodano vrednost, ki jo v vrednostni verigi obnovljive energije prejmejo upravljavci.

V skladu z Direktivo so države članice določile posamezne cilje za RES-E (electricity from renewable energy sources – elektriko iz obnovljivih virov energije). Za dosego teh ciljev države članice same izberejo mehanizem podpor, kar lahko nadaljujejo tudi v prehodnem obdobju najmanj sedem let po sprejetju novega pravnega okvira EU. Člen 4 Direktive določa, da *Komisija najpozneje do 27. oktobra 2005 predloži izčrpno dokumentirano poročilo o izkušnjah pri uporabi in sožitju različnih mehanizmov v državah članicah.* V poročilu se *v skladu z nacionalnimi okvirnimi cilji oceni uspeh programov podpore, vključno s stroškovno učinkovitostjo pri spodbujanju porabe električne energije, proizvedene iz obnovljivih virov*

[1] Direktiva 2001/77/ES z dne 27. septembra 2001 o spodbujanju proizvodnje električne energije iz obnovljivih virov energije na notranjem trgu z električno energijo. UL 27.10.2001, L 283/33. Datum za izvajanje te direktive je bil oktober 2003, za nove države članice pa 1. maj 2004.

energije. Ta člen tudi določa, da je poročilu *po potrebi dodan predlog za okvir Skupnosti v zvezi s programi podpore, če je to primerno.*

1.2. Področje uporabe

To sporočilo ima tri namene:

- To je poročilo, ki ga mora pripraviti Komisija v skladu s členom 4 Direktive 2001/77/ES, in ki vsebuje **poročilo o izkušnjah** pri uporabi in sožitju različnih mehanizmov držav članic za spodbujanje pridobivanja električne energije iz obnovljivih virov.

- Hkrati je tudi poročilo, ki ga mora Komisija pripraviti v skladu s členom 8 glede **upravnih ovir in vprašanj v zvezi z omrežji** ter vzpostavitve sistema **potrdil o izvoru** obnovljive energije.

- To je tudi načrt za uskladitev obstoječih sistemov, ki temelji na dveh stebrih: **sodelovanju** med državami ter **optimizaciji** nacionalnih programov, katerega rezultat je zbliževanju sistemov.

2. OCENA OBSTOJEČIH SISTEMOV PODPORE

2.1. Obstoječi sistemi podpore

V EU trenutno obstaja več različnih sistemov podpore, ki jih je v grobem mogoče razvrstiti v štiri skupine: tarife na dovajanje toka, zeleni certifikati, sistemi razpisov in davčne olajšave.

- **Tarife na dovajanje toka** obstajajo v večini držav članic. Za te sisteme je značilna postavljena cena, običajno določena za nekaj let, ki jo morajo elektrogospodarstva, običajno distributerji, plačevati domačim proizvajalcem zelene elektrike. Dodatne stroške takšnih sistemov plačajo v sorazmerju z obsegom prodaje dobavitelji, ki jo nato s premijo na končno ceno kWh zaračunajo porabnikom. Prednosti teh programov so naložbena varnost, možnost prilagajanja ter vzpodbujanje srednjeročnih in dolgoročnih tehnologij. Na drugi strani je takšen sistem na ravni EU težko usklajevati, lahko je v nasprotju z načeli notranjega trga, obstaja pa tudi nevarnost prekomernih podpor, če s postopnim zmanjševanjem podpor ni upoštevana krivulja učenja posamezne tehnologije RES-E. Različica programov tarife na dovajanje toka je tudi trenutno veljaven mehanizem fiksne premije na Danskem ter deloma v Španiji. V tem sistemu vlada določi fiksno premijo oziroma dodatek za okolje, ki se plačuje proizvajalcem RES-E nad običajno ceno elektrike ali nad ceno pri promptnih poslih.

- V sistemu **zelenih certifikatov,** ki se trenutno uporablja na Švedskem, v Združenem kraljestvu, Italiji, Belgiji in na Poljskem, je RES-E naprodaj po običajnih tržnih cenah. Za pokrivanje dodatnih stroškov pri proizvodnji zelene elektrike in za zagotovitev proizvodnje zelene elektrike morajo vsi porabniki (oziroma v nekaterih državah proizvajalci) od proizvajalcev RES-E kupiti neko število zelenih certifikatov glede na svoj dani delež ali kvoto celotne porabe/proizvodnje elektrike. Denarne kazni zaradi kršitev se nakazujejo v sklad za raziskave, razvoj in predstavitve obnovljivih virov ali neposredno v državni proračun. Ker si proizvajalci/porabniki prizadevajo kupiti certifikate po najnižji ceni, se vzpostavi sekundarni trg

certifikatov, kjer proizvajalci RES-E pri prodaji zelenih certifikatov medsebojno tekmujejo. Zato zeleni certifikati veljajo za tržni instrumenti, ki lahko teoretično, če deluje sistem pravilno, zagotovijo najboljši izkupiček za naložbo. Na enotnem evropskem trgu lahko ti sistemi delujejo učinkovito, in so teoretično izpostavljeni manjšemu tveganju zaradi prekomernih podpor. Vendar so zeleni certifikati za vlagatelje večje tveganje, saj takšni programi niso najprimernejši za razvoj dolgoročnih tehnologij, ki so zaenkrat povezane z visokimi stroški. Poleg tega prinašajo ti sistemi višje upravne stroške.

- Sistemi **razpisnih postopkov** obstajajo v dveh državah članicah (na Irskem in v Franciji). Vendar pa je Francija nedavno svoj sistem spremenila v kombinacijo sistema tarif na dovajanje toka in sistema razpisov, Irska pa je najavila podobno potezo. V razpisnem sistemu objavi država niz razpisov za dobavo RES-E, ki se nato dobavlja po pogodbeni ceni, ki izhaja iz razpisa. Dodatni stroški, ki nastanejo zaradi nakupa RES-E, prek posebnih dajatev plačajo končni uporabniki električne energije. Kljub temu, da razpisni sistemi teoretično optimalno izkoriščajo tržne sile, pa zaradi prekinitev, ki nastanejo z razpisi, ne zagotavljajo stabilnosti. V takšnem programu obstaja tudi tveganje neizvedbe projektov zaradi prenizkih razpisnih cen.

- Sistemi, ki temeljijo le na **davčnih olajšavah,** se uporabljajo na Malti in Finskem. V večini primerov (Ciper, Velika Britanija in Češka) pa se ta sistem uporablja le kot dodatno orodje.

Zgornja razvrstitev v štiri skupine je poenostavljena predstavitev sedanjega stanja. Prav tako se pojavljajo sistemi z mešanimi elementi, zlasti v kombinaciji z davčnimi olajšavami. Priloga 2 vsebuje pregled programov podpore v EU-25.

2.2. Ocena izvajanja

Stroški proizvodnje obnovljive energije se močno razlikujejo. Nacionalni, regionalni in kmetijski viri so v različnih državah članicah zelo različni. Zato je treba pri oceni programov podpore posamezne sektorje obravnavati posebej.

Med državami članicami obstajajo precejšnje razlike v **stopnjah podpore** RES-E. Priloga 3 navaja podrobno oceno razkoraka med skupnim zneskom za proizvodnjo obnovljive energije in proizvodno ceno[2], iz česar izhaja stroškovna učinkovitost posameznih programov. Čim večji je razkorak med „stroški proizvodnje“ in „podporo“, manjša je stroškovna učinkovitost sistema. Zaradi kompleksnosti različnih obnovljivih energij ter razlik v stanju posameznih držav, je bila izbrana primerjava po posameznih sektorjih. Iz medsebojne primerjave grafov v Prilogi 3 je mogoče razbrati učinkovitost in uspešnost.

V primeru vetrne energije kažejo zeleni certifikati precejšen razkorak med stroški proizvodnje in podporo. Razlogi za višje stroške so v višjih investicijskih stroških takšnih programov, verjetno pa tudi v še nerazvitem trgu zelenih certifikatov.

Vetrna energija v devetih od petindvajsetih držav članic prejema majhno podporo. V državah in sektorjih, v katerih je skupni prejeti znesek proizvajalcev nižji od stroškov proizvodnje, ni pričakovati sprememb.

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[2] Uporabljena je povprečna vrednost v letih 2003 in 2004. V tarif na dovajanje toka je raven cene podpore enaka vrednosti tarife. Uporabljeni vir pri navajanju stroškov proizvodnje je Green-X.

V primeru gozdne biomase polovica držav članic ne zagotavlja dovolj podpore za pokritje stroškov proizvodnje. V primeru naravnega plina skoraj tri četrtine držav članic ne zagotavlja podpore, potrebne za razvoj.

Poleg stroškov je za oceno različnih sistemov podpore ključnega pomena tudi **učinkovitost.**

Učinkovitost programov podpore pomeni dejansko zagotavljanje zelene energije.

Pri ocenjevanju učinkovitosti je zlasti težko ocenjevati novejše sisteme. Izkušnje z zelenimi certifikati je zlasti težko primerjati z izkušnjami uporabe tarif na dovajanje toka. Prav tako pa mora biti količina dobavljene zelene elektrike ocenjena glede na stvarne možnosti[3] države.

V primerih vetrne energije Priloga 3 kaže, da vse nadpovprečno učinkovite države uporabljajo tarife na dovajanje toka. Ta sistem trenutno zagotavlja najboljšo učinkovitost vetrne energije.

Raziskave v sektorju biomase niso tako jasne, kakor v sektorju vetrne energije. Pri stroških proizvodnje energije z biomaso so opazna velika odstopanja[4]. Takšna odstopanja so posledica: različnih virov (gozdni ostanki, hitro rastoče grmovje, slama, živalski odpadki, itd.), različnih postopkov pretvorbe (sežiganje ogljikovega monoksida, uplinjanje, itd.) ter različnih razredov velikosti (obstoječe velikosti rastlin za biomaso se razlikujejo za faktor 200). Zato so potrebne bistveno natančnejše raziskave, ki bodo temeljile na izbranem uporabljenem materialu in tehnologiji.

Kljub temu raziskave kažejo, da so rezultati sistema tarif na dovajanje toka in zelenih certifikatov v sektorju naravnega plina dobri (štiri države s sistemi tarif na dovajanje toka ter dve državi z zelenimi certifikati beležijo učinkovitost, ki je višja od evropskega povprečja). V sektorju gozdne biomase ni mogoče ugotoviti, kateri sistem je najboljši. Kompleksnost sektorjev in regionalna odstopanja kažejo na pomemben vpliv drugih faktorjev[5]. Načelno morajo spodbude za gozdno biomaso uporabnike spodbuditi k izkoriščanju še neuporabljenih biomas.

Pomembna je tudi primerjava **dobičkov z vidika vlagatelja** in učinkovitosti. Ta primerjava se že izvaja za omejeno število držav članic, navedene v Prilogi 4, podlaga zanjo pa so obstočječe cene v daljšem časovnem obdobju. Iz navedenega je mogoče razbrati, ali uspeh neke politike temelji zlasti na visokih finančnih spodbudah ali pa so bili za uspeh ključni drugi dejavniki v obravnavanih državah.

2.3. Glavne ugotovitve glede izvajanja (glej prilogi 3 in 4)

Vetrna energija

- Sistemi zelenih certifikatov zaenkrat zahtevajo bistveno višjo stopnjo podpore od sistemov tarif na dovajanje toka. To je mogoče pojasniti z višjimi premijami, ki jih zahtevajo

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[3] Možnosti so „stvarne dodatne možnosti, pod pogojem, da je mogoče premagati vse obstoječe ovire in aktivirati vse pospeševalne dejavnike“. Za podrobnejšo razlago glej Prilogo 3.

[4] Stroški za vetrno energijo na obali so med 40–100 EUR/MWh, stroški za biomaso pa med 25–220 EUR/MWh.

[5] Stopnja podpore biomasi je povezana predvsem z drugimi dejavniki, kot so izbira politike (veliki ali majhni obrati s sežiganjem skupaj z drugimi energetskimi viri ali brez …), manj pa z izbranim ukrepom (tarife na dovajanje toka ali zeleni certifikati).

vlagatelji zaradi tveganja, višjimi upravnimi stroški in trenutno nerazvitim trgom zelenih certifikatov. Vprašanje je, kako se bodo cene spreminjale srednjeročno in dolgoročno.

- Najučinkovitejši sistemi vetrne energije so trenutno sistemi tarif na dovajanje toka v Nemčiji, Španiji in na Danskem.

- Dobiček na kapital je za zelene certifikate višji od dobička od tarif na dovajanje toka. Ta dobiček (anuiteta) se izračuna z ekstrapolacijo trenutnih cen certifikatov[6]. Dobiček na kapital bo tako odvisen od prihodnjega gibanja cen.

- Raziskave kažejo, da je v četrtini držav članic podpora prenizka, da bi lahko sprožila razvoj. Nadaljnja četrtina držav članic zagotavlja zadostno podporo, vendar še vedno dosega le povprečne rezultate. Razlog za to so lahko omrežne in upravne ovire.

- Obravnavani sistemi, ki uporabljajo tarife na dovajanje toka, so učinkoviti tudi kljub razmeroma nizkemu dobičku proizvajalca. Po drugi strani zeleni certifikati trenutno zagotavljajo visoke stopnje dobička. Poudariti je treba, da so sistemi zelenih certifikatov razmeroma nov instrumenti. Zato je morda ugotovljeno stanje posledica pomembnih prehodnih učinkov.

Gozdna biomasa

- Danski sistem tarif na dovajanje toka ter centraliziranih obratov za skupno proizvodnjo z izgorevanjem slame[7] ter finski hibridni sistem podpore (davčne olajšave ter naložbe), dajeta najboljše rezultate tako glede učinkov, kot tudi ekonomske uspešnosti podpore. Ključni razlogi za takšen napredek so tradicija visokotehnološke uporabe biomase v energetske namene ter stabilni pogoji načrtovanja proizvodnje toplote.

- Kljub temu, da sistemi tarif na dovajanje toka načeloma prikazujejo boljše rezultate, pa je analiza sektorja gozdne biomase, glede na to, da tveganja vlagateljev z zelenimi certifikati razvoj sektorja ovirajo, bolj kompleksna. Tudi drugi dejavniki, poleg izbire finančnih instrumentov (infrastrukturne ovire, velikost objektov, optimalno upravljanje z gozdom ter obstoj sekundarnih instrumentov, itd.), pomembno vplivajo na učinkovitost posameznih sistemov.

V skoraj polovici evropskih držav podpora gozdni biomasi ne zadostuje za nadaljnji razvoj tega obetavnega sektorja. V mnogih regijah bi bile potrebne spodbude za izkoriščanje gozda, ter za povečanje dotoka lesa iz evropskih gozdov vsem uporabnikom, kar bi preprečilo možno izkrivljanje trga gozdnih odpadkov.

Sektor naravnega plina[8]

V šestih državah je učinkovitost višja od povprečja EU, štiri med njimi uporabljajo tarife na dovajanje toka (Danska, Nemčija, Grčija, Luksemburg), dve pa zelene certifikate (Združeno

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6 Najpomembnejše vprašanje je, kako se bo cena zelenih certifikatov spreminjala v prihodnjih letih. Raziskave, predstavljene v tem dokumentu, temeljijo na konstantni vrednosti certifikatov.

7 Uporaba slame za biomaso je vključena v analizo gozdne biomase, kljub temu, da izvorno ni gozdni proizvod. Danska je vodilna država, ki uporablja to vrsto biomase.

8 Naravni plin vključuje vse procese fermentacije biomase: naravni plin s fermentacijo druge biomase, odlagališčni plin in plin iz naprav za čiščenje odplak.

kraljestvo, Italija). Podobno kakor v sektorju gozdne biomase, vplivajo na rezultate tudi drugi dejavniki:

- Kmetijsko-ekonomske zmožnosti in izbira velikosti obratov. Veliki obrati so bolj učinkoviti. Majhni obrati so predvidoma pomembnejši za podeželsko gospodarstvo, vendar pa obratujejo z višjimi stroški.

- Obstoj dopolnilnih programov podpore. Sektor naravnega plina je povezan z okoljsko politiko ravnanja z odpadki. Nekatere države (Združeno kraljestvo) podpirajo uporabo naravnega plina s sekundarnimi ukrepi, kot so davčne olajšave. Tudi dopolnilna investicijska pomoč je dober spodbujevalec takšne tehnologije.

- Stroški proizvodnje kmetijskega naravnega plina[9] so sicer višji, vendar pa je višja tudi korist za okolje. Stroški proizvodnje zemeljskega naravnega plina so nižji, vendar pa je nižja tudi korist za okolje.

Skoraj 70 % držav EU ne zagotavlja ustrezne podpore za razvoj omenjene tehnologije.

Drugi obnovljivi energetski viri

Sektor malih vodnih elektrarn močno odstopa tako glede podpore, kot tudi stroškov proizvodnje. Na razvoj te tehnologije obnovljive energije pomembno vplivajo obstoječe ovire.

Uporabo sončne energije dejavno spodbujajo v Nemčiji (vodilna v svetu), na Nizozemskem, v Španiji, Luksemburgu in Avstriji.

Izčrpne raziskave malih vodnih in elektrarn na sončno energijo so vključene v Prilogi 3.

Obstajajo tudi drugi obnovljivi energetski viri za proizvodnjo elektrike, ki v ta dokument niso vključeni. Med njimi so velike vodne elektrarne, ki kot uveljavljeni vir obnovljive energije ne potrebujejo podpore. Geotermalna energija, energija valovanja in plime ter sončna termalna energija so drugi obnovljivi viri energij, ki v to poročilo niso vključeni, saj jih podpirajo samo v nekaterih državah članicah in ker se ne uporabljajo na industrijski ravni.

3. NOTRANJI TRG IN TRGOVINE

3.1. Uvod

Notranji trg električne energije in podpora RES-E sta med seboj tesno povezana. Obnovljive energije zagotavljajo gradnjo novih obratov ter tako prispevajo k varnosti dobave ter povečanju raznovrstnosti proizvajalcev električne energije. Hkrati vidiki notranjega trga (prosta trgovina, preglednost, ločenost projektov, razkritje in medsebojna povezanost) v okviru notranjih trgov elektrike pospešujejo razvoj RES-E. V mnogih primerih zagotavljajo podporo obnovljivim virom energije smernice Skupnosti o državnih pomočeh za zaščito okolja[10]. Pravila o državnih pomočeh lahko vplivajo na zasnovo programov podpore.

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[9] Kmetijski naravni plin je rezultat obdelave odpadkov reje živali in gojenja navadnih ali posebnih energetskih rastlin. Odlagališčni plin vključuje izkoriščanje metana iz odlagališč odpadkov.

[10] UL C 37, 3.2.2001, str. 3.

3.2. Ločenost projektov, preglednost in podjetja s prevladujočim vplivom

Na ločenem trgu[11] sta neodvisni upravljavec prenosnega omrežja (TSO – Transmission System Operator) in neodvisni upravljavec distribucijskega omrežja (DSO - Distribution System Operator) zavezana vsem proizvajalcem omogočati enakopraven dostop do omrežja ter razviti mrežno infrastrukturo v skladu z dolgoročno strategijo, upoštevajoč obnovljive energetske vire.

Za nekatere države je še vedno značilna prevlada enega ali nekaj energetskih podjetij, ki so večkrat tudi vertikalno integrirana. To lahko povzroči monopolu podobno stanje, ki bi utegnilo zatreti razvoj RES-E.

Za učinkovito delovanje **vseh** sistemov podpore za RES-E so v celoti neodvisni TSO-ji in DSO-ji ključnega pomena.

Države morajo izboljšati obveščenost potrošnikov o načinu prenosa stroškov podpore obnovljivi energiji na končnega uporabnika. Po ocenah Evropske komisije znaša podpora obnovljivim virom v Španiji, Združenem kraljestvu in Nemčiji med 4 % in 5 % tarife električne energije, na Danskem pa celo do 15 % stroškov tarife. Delež ne-vodnih RES-E v teh državah znaša trenutno 3,5 % v Združenem kraljestvu, 9 % v Nemčiji, 7 % v Španiji in 20 % na Danskem (glej Prilogo 5).

3.3. Prekinitve proizvodnje in uravnavanje moči: ustrezna ureditev povezave med notranjim trgom in obnovljivim urejanjem

Vetrna energija, podobno kot drugi obnovljivi viri, ni nenehno na voljo. Najbolj pomembni so naslednji vidiki:

- Napovedovanje vetra. V državah kot so Danska, Združeno kraljestvo in Španija morajo proizvajalci RES-E, tako kot drugi proizvajalci elektrike, svojo proizvodnjo predvideti. Točnejša je napoved, večja je vrednost takšnega vira RES-E.

- Trenutek zaprtja[12] Če je ta trenutek blizu obratovalni uri, lahko proizvajalci RES-E, ki je ni mogoče neprekinjeno pridobivati, ocenijo količino elektrike, ki jo lahko zagotovijo.

- Zaračunavanje stroškov uravnavanja. Združeno kraljestvo, Danska in Španija[13] so vzpostavile sisteme za zaračunavanje odstopanj od predvidene proizvodnje elektrike, ne glede na njeno poreklo, vključno z vetrno energijo. Podrobnejša analiza stroškov uravnavanja je v Prilogi 5.

Inteligentno načrtovanje programov podpore lahko prispeva k zmanjšanju tega problema.

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[11] Ločevanje je opredeljeno v Direktivi 2003/54/ES: zaradi zagotovitve učinkovitega in nediskriminatornega dostopa do omrežja, morajo prenosne in distribucijske sisteme upravljati pravno ločene pravne osebe, zlasti dejavnosti proizvodnje in dobave energije.

[12] Trenutek, do katerega morajo proizvajalci električne energije objaviti svojo ponudbo na energetskih trgih.

[13] Združeno kraljestvo uporablja zelene certifikate kot glavni program podpore za obnovljive vire. Danska in Španija imata tarife na dovajanje toka.

V primerih, kjer proizvodnja energije iz virov, ki niso nenehno na voljo, zavzema velik del domače proizvodnje energije, je pomembno, da se proizvajalci RES-E kar najbolje prilagajajo cenam energije na trgu. Integraciji velikih delov tovrstne energije RES-E v sistem je lahko v pomoč sistem podpore, ki vključuje povezavo s ceno energije pri promptnih poslih ali pristop porazdelitve tveganja. Tako je tudi v primerih sistema premij[14], sistema zelenih certifikatov in nekaterih programov tarif na dovajanje toka, kot je program v Španiji[15].

3.4. Trgovanje z energijo

Vpliv različnih programov podpore na trgovanje je pomemben vidik združljivosti podpornih ukrepov RES z notranjim trgom. Treba je razlikovati med fizičnim trgovanjem z energijo (elektriko) ter zeleno vrednostjo elektrike.

Fizično trgovanje z RES-E je podvrženo enakim omejitvam, ki sicer veljajo za običajno elektriko[16]. To je načelno mogoče in se tudi izvaja. Razvoj RES-E bi verjetno povečal potrebo po čezmejnem energetskem trgovanju ter močnejših povezavah.

Člen 3(6) Direktive 2003/54/ES določa obvezno razkritje sistema v skladu s katerim je treba potrošnike seznaniti s prispevkom posameznega vira energije v skupno mešanico goriva. Celostna uvedba razkritja bi povečala zeleno vrednost obnovljive energije. Razkritje porekla elektrike bi prav tako pomenilo dodatno vrednost portfelja proizvajalca z visokim deležem energije RES.

3.5. Pravila o državni pomoči

Ob načelnem obravnavanju konkurence na trgu RES in v evropskem gospodarstvu kot celoti je treba upoštevati tudi učinke izkrivljanja tekočega delovanja trgov, ki jih lahko povzroči podpora. Kot navaja odstavek 12 preambule Direktive 2001/77/ES, se pravila Pogodbe in zlasti njena člena 87 in 88 nanašata na podporo javnosti. Takšna podpora je običajno predmet smernic Skupnosti o državnih pomočeh za zaščito okolja in je lahko ekonomsko upravičena na podlagi več različnih temeljev, saj je korist zaradi takšnih ukrepov večja od učinkov izkrivljanja konkurence. Ker je uporaba obnovljivih virov energije prednostna politika Skupnosti, so navedene Smernice takšnim programom podpore naklonjene. Na tej podlagi je Komisija v obdobju med letoma 2001 in 2004 odobrila približno 60 programov državnih pomoči za podporo obnovljivim energetskim virom.

3.6. Glavne ugotovitve

Združljivost vseh različnih programov podpore obnovljive energije z razvojem notranjega trga električne energije je ključnega srednjeročnega in dolgoročnega pomena. Evropski notranji trg mora biti, ob upoštevanju korakov potrebnih za razvoj RES-E, ustrezno oblikovan. Zasnova trga je ključnega pomena za razvoj in uveljavitev RES-E. Kjer je mogoče, je treba upoštevati pravila o državni pomoči pri zasnovi programov podpore.

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[14] Sistem premij je običajno opredeljen kot sistem tarif na dovajanje toka, vendar obstajajo razlike: proizvajalci RES poleg tržne cene prejmejo dodatno premijo. Končna cena, ki se zaračuna za RES-E, niha in je odvisna od normalne tržne cene elektrike.

[15] Sistem tarif na dovajanje toka v Španiji vključuje zaračunavanje odstopanj v proizvodnji elektrike proizvajalcev RES – enako kot za preostale proizvajalce.

[16] Trenutno je 11 % vse elektrike v Evropi predmet fizičnega čezmejnega trgovanja.

4. SOOBSTOJ ALI USKLAJEVANJE

Zaradi širokih odstopanj v zmožnostih in razvitosti različnih držav članic glede obnovljivih energij, bo uskladitev v kratkem času težko doseči. Dodatno utegnejo kratkoročne spremembe sistema povzročiti motnje na nekaterih trgih ter državam članicam otežiti izpolnitev zastavljenih ciljev. Ne glede na to, je treba prednosti in slabosti usklajevanja trenutno različnih sistemov proučiti in spremljati, zlasti z vidika srednjeročnega in dolgoročnega razvoja.

4.1. Možne prednosti

- Več študij ugotavlja, da bi bili skupni stroški spoštovanja ciljnega deleža RES-E do leta 2010 občutno nižji ob usklajenosti zelenih certifikatov ali programov tarif na dovajanje toka, kot v primeru nadaljevanja današnjih različnih nacionalnih politik. Ne glede na to pa sta za zagotovitev stroškovne učinkovitosti in odpravo izkrivljanj trga s podporo konvencionalnim virom energije potrebna boljši notranji trg električne energije in večja povezanost in tržna zmožnost.

- Integracija obnovljivih energij v notranji trg z enotnim sistemom pravil lahko ustvari ekonomije obsega, ki so potrebne za razcvet in večjo konkurenčnost industrije obnovljive električne energije.

- Program zelenih certifikatov za vso Evropo lahko ustvari večji ter bolj likviden trg certifikatov, zaradi manjših (nacionalnih) trgov pa bi bile cene zelenih certifikatov stabilnejše. Ne glede na to pa bi bilo treba upravne stroške takšnega sistema vrednotiti glede na upravne stroške trenutnega stanja.

- Skupni evropski program tarif na dovajanje toka, ki bi upošteval dostopnost lokalnih virov, bi lahko znižal stroške vseh tehnologij RES v različnih državah članicah, saj obrati niso omejeni na posamezne države članice. Takšen sistem tarif na dovajanje toka lahko sestoji iz fiksne ali „premijske“ tarife, prištete osnovni ceni, ki je vezana na povprečno ceno elektrike.

4.2. Možne slabosti

- Usklajeni program zelenih certifikatov je učinkovit le, če so njegov rezultat ustrezne cene certifikatov in kazni po vsej EU ter nadalje učinkovita gradnja objektov RES v raznih državah. Večja nihanja v ceni zelenih certifikatov lahko povzročijo povečanje investicijske negotovosti in zmanjšanje gradnje objektov RES.

- Za najboljšo ureditev tarif ter ohranitev nizkih stroškov usklajenih sistemov tarif na dovajanje toka je potrebna precejšnja količina informacij o tehnologijah in stroških. Sistem lahko zato, če navedena vprašanja niso pravilno razrešena, postane drag in neprilagodljiv.

- Usklajevanje s programom zelenih certifikatov, ki različnosti tehnologij ne bi upoštevala, bi na dinamično učinkovitost vplivala negativno. Ker bi takšen program najprej spodbujal stroškovno učinkovitost, bi se razvijale le tehnologije, ki so trenutno najkonkurenčnejše. Čeprav bi bil takšen rezultat kratkoročno koristen, program zelenih certifikatov ne bi v zadostni meri spodbujal naložb v druge obetavne tehnologije. Takšen program bi morali zato dopolnjevati dodatni ukrepi.

- Države članice, ki v usklajenem sistemu postanejo uvozniki RES-E, morda ne bodo želele plačevati stroškov, če jim ne bodo v korist lokalni pozitivni učinki (zaposlovanje, razvoj podeželja, raznovrstnost in zato večja varnost domačih virov energije ter zmanjšano lokalno onesnaževanje), ki bi nastali pri lokalni proizvodnji obnovljive energije.

- Po drugi strani pa tudi države izvoznice morda ne bi bile naklonjene povečevanju zmogljivosti za RES, ki bi presegale njihove lastne potrebe, saj bi lahko lokalno prebivalstvo nasprotovalo gradnji novih objektov RES (NIMBY[17]).

5. UPRAVNE OVIRE

Razprave glede programov podpore je nemogoče ločiti od vprašanja upavnih ovir. Za zagotovitev stroškovno učinkovite razširjenosti RES-E je treba ustvariti učinkovit in preprost postopek povečevanja proizvodnje RES-E.

To poglavje – v skladu s členom 6 Direktive 2001/77/ES – analizira različne težave in predlaga nekatere rešitve odpravljanja upravnih bremen (za podrobnejše informacije glej Prilogo 6).

5.1. Opredelitev ovir

Ovire, ki jih imajo lahko pripravljavci in vlagatelji projektov ob gradnji novih zmogljivosti, so lahko upravne, omrežne, socialne ali finančne. Nedavno je Komisija pričela postopkom javnega posvetovanja o tem, kako javnost gleda na ovire[18].

Opredeljene upravne ovire je mogoče razporediti v naslednje skupine:

1. Veliko število vpletenih državnih organov ter slabo medsebojno usklajevanje

Pomembno vprašanje, ki lahko ovira večjo število obnovljivih energetskih virov, je obstoječa večstopenjska pristojnost za potrjevanje proizvodnih objektov. Pogoji, ki jih zahteva množica vpletenih državnih organov (nacionalni, regionalni in lokalni) pogosto povzročajo zamude, investicijsko negotovost, povečanje obsega dela ter potencialno večje zahteve po vzpodbudah za pripravljavce, ki bi odtehtale povečana investicijska tveganja ali začetno kapitalsko intenzivnost projekta.

Kadar so vpleteni državni organi različnih stopenj, morajo države članice oblikovati enotne **agencije za izdajo dovoljenj**, odgovorne za usklajevanje različnih upravnih postopkov, kot je na primer Bundesamt für Seeschifffahrt und Hydrographie za obalne vetrne elektrarne v Nemčiji. Različni organi morajo uporabljati tudi standardne obrazce in pogoje.

2. Zamudno pridobivanje potrebnih dovoljenj

Postopki izdaje dovoljenj za projekte vetrnih elektrarn na kopnem trajajo od dve do sedem let[19], kar je v nekaterih primerih privedlo do obtožb o popolni „zamrznitvi“ razvoja trga.

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17 NIMBY je akronim za „Not In My Back Yard“ – „ne na mojem dvorišču“.

18 Posvetovanja s prizadetimi so obsegala internetni vprašalnik in spremljajoče pogovore. Navedeni postopek je opisan v oceni vplivov, ki je del tega sporočila.

19 Navedeno obdobje velja za Nizozemsko in Škotsko.

Postopki izdaje dovoljenj za projekte priobalnih vetrnih elektrarn so še bolj neučinkoviti, saj do nedavnega ni bila vzpostavljena niti jasna delitev odgovornosti različnih vpletenih državnih organov.

Zelo priporočljive so jasne smernice postopkov izdaje dovoljenj, vanje pa morajo biti vpeti tudi obvezni roki za odgovore pooblaščenih državnih organov. Določitev cilja za stopnje odobritev[20] je odličen način za preverjanje hitrosti izdaje dovoljenj.

3. Nezadostno upoštevanje RES pri prostorskem planiranju

V mnogih državah in regijah prihodnji razvoj projektov RES ob pripravi prostorskih planskih načrtov ni upoštevan. To pomeni, da je za izvedbo projektov RES-E na nekem področju treba sprejeti nove prostorske načrte. Tak postopek je lahko zelo dolgotrajen. Pogosto predstavlja pridobivanje dovoljenj, povezanih s prostorskim planiranjem, najdaljši del celotnega obdobja izvedbe projekta. To velja zlasti za projekte vetrnih elektrarn in elektrarn na biomaso. Državne organe je treba spodbujati, da z določitvijo ustreznih območij v posameznih regijah **predvidijo razvoj prihodnjih projektov RES (pred-načrtovanje).**

Kadar so vpleteni državni organi z različnih stopenj odločanja, je mogoče uporabiti rešitev **pred-načrtovanja** po vzoru Danske in Nemčije, kjer morajo lokalne oblasti določiti lokacije, ki so dane na voljo pripravljavcem projektov za ciljno stopnjo proizvodnih zmogljivosti obnovljive elektrike. Na teh pred-načrtovanih področjih je zahtev za dovoljenja manj in jih je mogoče podeliti hitreje. Na Švedskem se takšna področja imenujejo „področja nacionalnega interesa za veter“.

Postopek načrtovanja in izdajanja dovoljenj je povezan tudi s spoštovanjem evropske okoljske zakonodaje, kot sta Okvirna direktiva o vodah ter Direktiva o habitatih in pticah. Komisija bo z delom nadaljevala – na primer z obstoječo iniciativo povezave med Okvirno direktivo o vodah in Direktivo o elektriki iz obnovljivih virov, kot je vodna energija – da bi tako povečala preglednost in jasnost izvajanja direktiv, povezanih z razvojem obnovljive energije.

5.2. Priporočila glede upravnih ovir

Ker so postopki izdaje dovoljenj v različnih državah članicah zelo razlikujejo, je mogoče priporočila za izboljšanje oblikovati le splošno. Direktiva o obnovljivih virih (2001/77/ES) zahteva skrajšanje skupnih postopkov izdaje dovoljenj. To je mogoče doseči z jasno zavezo in sodelovanjem osrednjih vlad z regionalnimi in lokalnimi oblastmi – vendar pa je na vseh ravneh potrebna zelo jasna razmejitev pristojnosti. Komisija priporoča naslednje ukrepe:

- Ustanovitev **enotnih agencij za izdajo dovoljenj,** ki vodijo postopek odobritve prijav in zagotavljajo pomoč prijaviteljem.

- Države članice morajo za postopke izdaje dovoljenj sprejeti **jasne smernice** z jasno delitvijo pristojnosti. Kot izhaja iz pravne prakse Evropskega sodišča, morajo postopki izdaje dovoljenj temeljiti na podjetjem vnaprej znanih objektivnih in

[20] Britansko združenje za vetrno energijo (Wind Energy Association) objavlja letne podatke o stopnji odobritev. V letu 2004 je bila stopnja odobritev 80 %.

nediskriminatornih merilih, ki omejujejo uporabo diskrecijske pravice državnih oblasti ter preprečujejo arbitrarnost[21].

- Države članice morajo vzpostaviti **mehanizme pred-načrtovanja** za določitev regij in lokalnih skupnosti, ki morajo določiti lokacije za različne vire obnovljivih energij.

- Za majhne projekte je treba pripraviti **enostavnejše postopke.**

- Smernice o razmerju do evropske okoljske zakonodaje.

6. VPRAŠANJA DOSTOPA DO OMREŽJA

Cenovno ugoden in pregleden dostop do omrežja je glavni cilj člena 7 Direktive 2001/77/ES in hkrati ključen za razvoj obnovljivih virov proizvodnje elektrike. Direktiva zahteva, da države članice sprejmejo ukrepe, ki bodo obnovljivi električni energiji olajšali dostop do omrežja.

Omrežna infrastruktura, zgrajena pretežno v času javnega lastništva v sektorju električne energije, je bila načrtovana za gradnjo velikih elektrarn ob rudnikih, rekah ali v bližini glavnih centrov porabe. Proizvodnja obnovljive električne energije se običajno ne razvije na istih območjih kot konvencionalna proizvodnja, prav tako pa je običajno drugačen tudi njen obseg. Kljub temu, da imajo nekatere elektrarne na biomaso zmogljivost približno 200 MW, prav tako pa podobno velikost dosegajo že nekatera vetrna polja, je običajna velikost elektrarn obnovljive električne energije manjša. Proizvodnja obnovljive elektrike je običajno že priključena na distribucijsko omrežje, večkrat pa je potrebno podaljševanje in ojačanje mreže ali dodatne investicije za priključitev. Večina držav članic je vzpostavila **zakonske predpise**, ki upravljavce omrežij zavezujejo k prenosu in distribuciji obnovljive električne energije. Prednostni dostop pri usmerjanju na prenosni ravni pa največkrat ni zagotovljen.

Potrebna so **pregledna pravila** glede plačila in delitve stroškov potrebnih investicij v omrežje, saj so mnoge omrežne ovire posledica prav takšne neurejenosti. Vzpostavljena pravila in stopnje njihove preglednosti se med državami članicami zelo razlikujejo. Preglednost delitve stroškov še ni ustrezno uveljavljena.

Dobro prakso je mogoče najti v več državah, na primer na Danskem, Finskem, v Nemčiji in na Nizozemskem. V teh državah so že vzpostavljena pregledna pravila plačila in delitve različnih stroškov investicij v omrežje. Te države so izbrale pristop „plitvih“ stroškov, v skladu s katerim stroške omrežnih povezav nosijo pripravljavci projektov, ki priklop zahtevajo, ali pa se delijo z upravljavci omrežja, stroške potrebnih podaljšanj in ojačitev omrežja na distribucijski ali prenosni ravni pa nosijo upravljavci sami, nato pa se skozi strukturo omrežne tarife zaračunajo dalje. Na Danskem upravljavci omrežja nosijo tudi nek del stroškov priključitve vetrnih elektrarn, kar za proizvajalce vetrne energije zmanjša ekonomsko breme stroškov investicij v omrežje. Kljub temu, da Nizozemska ne zagotavlja prednostnega dostopa, običajno vse stroške priključitve nosijo upravljavci omrežja.

Za RES-E morda niso na voljo ustrezne zmogljivosti omrežja. Takšna ovira je zaradi odsotnosti jasnih pravil glede plačila in delitve različnih stroškov investicij v omrežje ter obstoječih vertikalnih povezav in prevladujočih koristi še večja.

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[21] Glej sodbo Evropskega sodišča 20/2/2001 C-205/99, “Analir”

Da bi RES-E lahko imeli pomemben delež pri ponudbi električne energije, je potrebno boljše načrtovanje in celostno upravljanje omrežij. Vseevropski program energetskih omrežij ter okvirni programi raziskav in razvoja tehnologij Evropske unije so pričeli podpirati študije o prilagoditvi omrežij ter optimizaciji povezovanja projektov RES-E.

Prvič, Komisija priporoča popolno preglednost in nediskriminatornost načel plačila in delitve stroškov. Drugič, za nadaljnji napredek proizvodnje obnovljive elektrike, je treba razviti omrežno infrastrukturo. Tretjič, stroške razvoja omrežne infrastrukture naj običajno nosijo upravljavci omrežja. Četrtič, določanje cene elektrike v celotnem električnem omrežju mora biti pošteno in pregledno, upoštevati pa je treba tudi koristi vključene proizvodnje.

7. POTRDILA O IZVORU

Države članice morajo vzpostaviti sistem potrdil o izvoru elektrike, proizvedene z obnovljivimi viri, in s tem zagotoviti preglednost trgovanja in porabe[22]. Na prošnjo morajo zagotoviti izdajo potrdila o izvoru. Izvajanje izdaje potrdil o izvoru se med državami članicami razlikuje, kot je razvidno iz Priloge 7.

Nova Direktiva o notranjem trgu z električno energijo[23] je bila sprejeta po Direktivi 2001/77/ES. V skladu s členom 3(6) Direktive 2003/54/ES morajo države članice sprejeti program za razkritje gorivne mešanice. Komisija to določbo sprejema kot pomemben ukrep za dosego ciljev preglednosti porabe, saj zajema celotni sektor električne energije in ne le elektrike iz obnovljivih energetskih virov. Potrdilo o izvoru se lahko uporabi kot podlaga za takšno informacijo.

Trgovanje z zeleno elektriko že poteka, vendar doslej še ni bilo čezmejnega prenosa zelene elektrike, katerega namen bi bil izpolnitev ciljev druge države. Za izognitev dvojnemu štetju je nujno potreben enoten sistem potrdil o izvoru. Kljub temu pa je potreben tudi zanesljiv sistem odkupa „uporabljenih“ zelenih certifikatov. Takšen sistem je že uveden v več državah članicah, mogoče pa je dodatno usklajevanje ali celo harmonizacija, če bi to omogočilo večji obseg čezmejnega trgovanja.

8. SKLEPNE UGOTOVITVE

Obdobje usklajevanja

Po pomembnih izkušnjah s programi podpor za obnovljivo energijo na ravni EU lahko tudi konkurenčni nacionalni programi, vsaj v prehodnem obdobju, veljajo za koristne. Konkurenčnost programov mora zagotoviti večjo raznovrstnost pristopov pa tudi koristi: za sistem zelenih certifikatov je na primer koristen program tarif na dovajanje toka, saj stroški manj učinkovitih tehnologij, zaradi procesa tehnološkega učenja, padajo, posledično pa se znižajo tudi stroški prenosa potrošnikov. Prav tako je še prezgodaj za oceno prednosti in slabosti uveljavljenih mehanizmov podpore za sisteme, ki so v uporabi šele kratek čas. Komisija zato ob upoštevanju ugotovitev tega sporočila meni, da predstavitev usklajenega evropskega sistema zaenkrat še ni primerna.

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22 Člen 5 Direktive 2001/77/ES.

23 Direktiva 2003/54/ES o skupnih pravilih za notranji trg z električno energijo in o razveljavitvi Direktive 96/92/ES.

Komisija meni, da je najustreznejši **usklajen** pristop k programom podpore za obnovljive energetske vire zasnovan na dveh temeljih: **sodelovanje** med državami in optimizacija vplivov na nacionalne programe.

8.1. Sodelovanje

Povečano usklajevanje oziroma **sodelovanje** med državami lahko koristi razvoju različnih evropskih sistemov podpore. Porajajoče se sodelovanje med sistemi tarif na dovajanje toka v Nemčiji, Španiji in Franciji ali na iberskem trgu in načrti za novi združeni švedsko-norveški sistem zelenih certifikatov lahko služijo kot dober zgled. Države članice z dovolj podobnimi sistemi se lahko pozneje odločijo za medsebojno usklajevanje.

8.2. Optimizacija

Komisija predlaga postopek **optimizacije nacionalnih sistemov** ter opozarja, da nestabilnost ali neučinkovitost potrošnikom običajno povzročita višje stroške. Optimizacija zadeva ekonomske mehanizme ter stroškovno učinkovitost, hkrati pa zahteva tudi odstranitev upravnih in omrežnih ovir.

Države članice optimizirajo in prilagodijo programe podpore tako, da poskrbijo za:

- **Povečanje stabilnosti zakonodaje in zmanjšanje naložbenih tveganj.** Eden od glavnih problemov nacionalnih programov podpore je nestabilnost sistemov. Posledica nestabilnosti so visoka naložbena tveganja, kar za potrošnike običajno pomeni višje stroške. Za zmanjšanje verjetnih tveganj morajo udeleženci na trgu zaupati dolgoročni stabilnosti in zanesljivosti sistema. Pomembno vprašanje, zlasti na trgu zelenih certifikatov, je zmanjšanje naložbenih tveganj in povečanje likvidnosti. Zasnova podpornega mehanizma mora zmanjšati nepotrebna tržna tveganja. Povečana likvidnost lahko izboljša možnosti za dolgoročne pogodbe ter zagotovi preglednejšo tržno ceno.

- **Zmanjšanje upravnih ovir,** vključno s pospešitvijo upravnih postopkov. Treba je zmanjšati upravne zahteve za dostop do programov podpore in tako razbremeniti potrošnike. Jasne smernice, enotne agencije za izdajo dovoljenj, vzpostavitev mehanizmov pred-načrtovanja ter poenostavljeni postopki so, poleg celostne uveljavitve Direktive RES-E, konkretni predlogi državam članicam.

- **Vprašanja omrežij** ter preglednost pogojev priključevanja. Z ustreznim financiranjem je treba načrtovati in nadalje razvijati ojačitev prenosa. Prvič, Komisija priporoča popolno preglednost in nediskriminatornost načel plačila in delitve stroškov. Drugič, za nadaljnji napredek proizvodnje obnovljive elektrike, je treba razviti omrežno infrastrukturo. Tretjič, stroške razvoja omrežne infrastrukture naj običajno nosijo upravljavci omrežja. Četrtič, določanje cene elektrike v celotnem električnem omrežju mora biti pošteno in pregledno, upoštevati pa je treba tudi koristi vključene proizvodnje.

- **Spodbujanje tehnološke raznovrstnosti.** Nekateri programi podpore podpirajo le stroškovno najkonkurenčnejše obnovljive tehnologije. Priobalne vetrne elektrarne ne bi mogle nastati v pogojih finančnih okvirjev kopenskih vetrnih elektrarn. Takšen program je za zagotovitev raznolikosti tehnološkega razvoja mogoče dopolniti z

drugimi podpornimi ukrepi. Najboljše je, da ustrezna celostna politika podpore obnovljivi električni energiji zajema različne tehnologije obnovljivih virov.

- Države članice morajo bolje izkoristiti možnosti **davčnih izjem in olajšav,** dostopnih obnovljivim energetskim virom v skladu z Direktivo o obdavčitvi energentov[24].

- **Zagotavljanje združljivosti z notranjim trgom električne energije.** V državah članicah EU poteka postopek liberalizacije energetskih trgov. To merilo ocenjuje preprostost vključitve programa podpore v liberalizirani energetski trg ter učinkovitost njegovega delovanja skupaj z obstoječimi in novimi ukrepi.

- **Spodbujanje zaposlovanja in lokalnih ter regijskih koristi.** Podpora obnovljivim virom prinaša javnosti pomembno korist – zaposlovanje, socialne ukrepe, podeželski razvoj – spoštovati in upoštevati pa je treba tudi nacionalne cilje.

- **Kombinacija ukrepov energijske učinkovitosti in upravljanja povpraševanja.** Korist zaradi proizvodnje obnovljive električne energije izničuje pretirana rast porabe električne energije, čemur se je treba izogniti. Le kombinacija podpornih ukrepov RES-E ter ukrepov učinkovite končne rabe električne energije bo Evropi omogočila izpolnitev zastavljenih energetskih ciljev.

8.3. Naslednji koraki

Večje spremembe predpisov na ravni Skupnosti za dosego ciljev do leta 2010 kratkoročno niso priporočljive. Vendar pa bo Komisija, ob upoštevanju težnje h konkurenčnosti notranjega trga električne energije in potenciala za povečanje stroškovne učinkovitosti, še naprej proučila dodatne možnosti in vplive povečane optimizacije, usklajevanja in možne harmonizacije, pogojev za napredek in liberalizacijo ter zmogljivosti prenosa, poleg tega bo črpala nova spoznanja iz izkušenj različnih programov podpore držav članic.

Komisija bo podrobno spremljala stanje ukrepov obnovljivih virov v EU in najpozneje do decembra 2007 sestavila poročilo o ravni sistemov držav članic za spodbujanje obnovljive električne energije, ki je del niza obstoječih ocen v zvezi s cilji za leto 2020 in okvira politike za obnovljivo energijo po letu 2010. Na podlagi ugotovitev te ocene lahko Komisija predlaga drugačen pristop in okvir programov podpore za elektriko, proizvedeno z obnovljivimi energetskimi viri v Evropski uniji, ob upoštevanju potrebe po ustreznem prehodnem obdobju in predpisih. Predvsem bodo poučene prednosti in slabosti nadaljnjega usklajevanja.

Evropski parlament je nedavno sprejel Resolucijo o obnovljivi energiji[25], ki pojasnjuje merila za možno prihodnjo harmonizacijo evropskega sistema spodbud.

V skladu s členom 4 Direktive 2001/77/ES bo Komisija še naprej ocenjevala uspeh programov podpore, vključno s stroškovno učinkovitostjo podpornih sistemov. Temu poročilu se po potrebi doda predlog za okvir Skupnosti v zvezi s programi podpore za električno energijo, proizvedeno iz obnovljivih virov energije. Kakršen koli predlog za okvir mora:

(a) prispevati k doseganju nacionalnih okvirnih ciljev;

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[24] Direktiva 2003/96/ES za obdavčitev energentov in električne energije (UL 283, 31.10.2003, str. 51)

[25] Resolucija EP z dne 28. septembra 2005 (Sporočilo Turmes o deležu obnovljivih energetskih virov).

(b) biti združljiv z načeli notranjega trga električne energije;

(c) upoštevati značilnosti različnih virov obnovljive energije ter različne tehnologije in zemljepisne razlike;

(d) na preprost način spodbujati učinkovito uporabo obnovljivih energetskih virov, ter mora biti hkrati kolikor je mogoče učinkovit, zlasti z vidika stroškov;

(e) vključevati zadostna prehodna obdobja za nacionalne programe podpore, ki naj trajajo najmanj sedem let in ohranjajo zaupanje vlagateljev.

Annex 1 – Current share of electricity from renewable energy sources

Renewable energies promise to bring about strategic improvements in the security of supply, reducing the long-term price volatility to which the EU is subject as a price-taker for fossil fuels, and could offer an enhanced competitive edge for the EU's renewable technology industry. Renewable energies reduce air pollution and greenhouse gas emissions. They could also help improve economic and social prospects in the rural and isolated regions of industrialised countries and provide a better means of meeting basic energy needs in developing countries. The cumulative effect of all these benefits makes a robust case for supporting renewables. The EU aims at having renewable sources provide for 21% of the electricity consumed in its 25 member states by 2010. Romania and Bulgaria have set up a target by 2010, maintaining the objective for the enlarged Union at 21%[26]. This target is formulated in the EU Renewables Directive 2001/77/EC, which sets individual national targets to this end. The electricity produced by renewable energy sources (RES-E) in the EU-25 countries accounted for 394 TWh in 2003, corresponding to a share of 14% in electricity generation (see Figure 1). The recent very dry years and the considerable growth of electricity consumption affect the percentage of RES-E in consumption as a whole. One percentage point of the objective on renewable electricity has been missed in the last three years due to the important draughts occurring in Europe. Electricity consumption is growing at 2% per year.

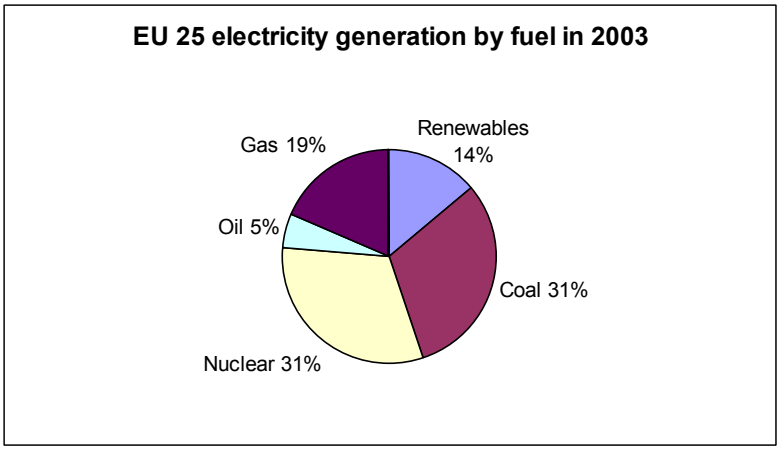

Figure 1:
EU25 electricity generation by fuel in 2003.

To avoid the interference due to the variability of rain conditions in recent years, Figure 2 shows all renewable energies apart from hydropower. In recent years, the growth in renewable electricity has been faster with the non-hydro sources. Figure 2 shows the impressive evolution of wind (three countries were mainly responsible for the growth of this sector up to 2003) and the other sectors such as biomass, geothermal and photovoltaic solar energy.

[26] Romania has set up a target for passing from 28% to 33% by 2010 and Bulgaria from 6% to 11% by 2010.

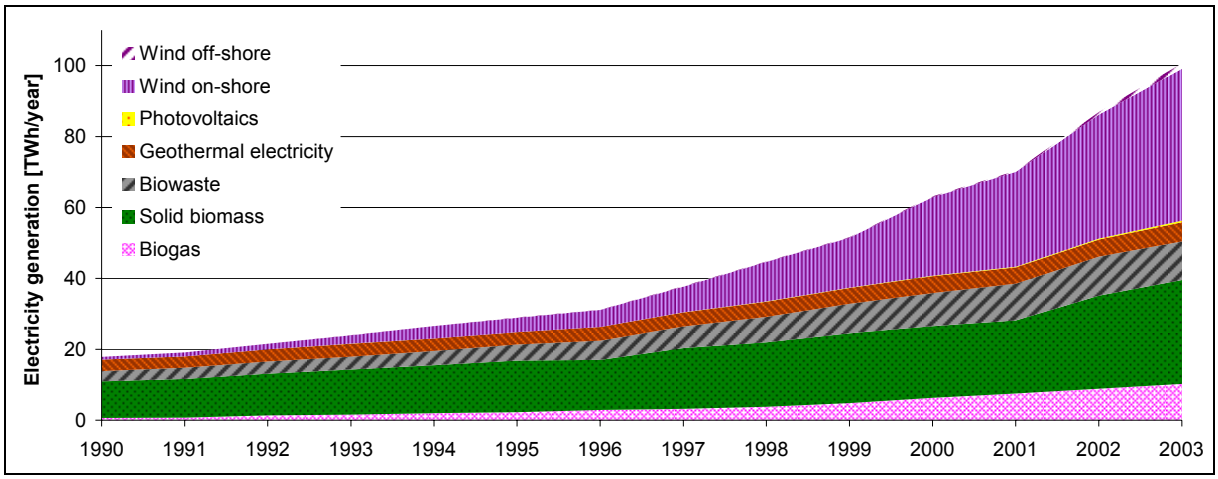

Figure 2:
Historical development of electricity generation from 'new' RES-E in the European Union (EU-25) from 1990 to 2003.

Hydropower remains the dominant source, but new renewable sources such as biomass or wind are starting to play a role. Especially in the EU-15 countries, wind energy is the most important of the new renewable sources in recent portfolios with a yearly growth of 35% in the last ten years while biomass is prominently represented in some of the new Member States.

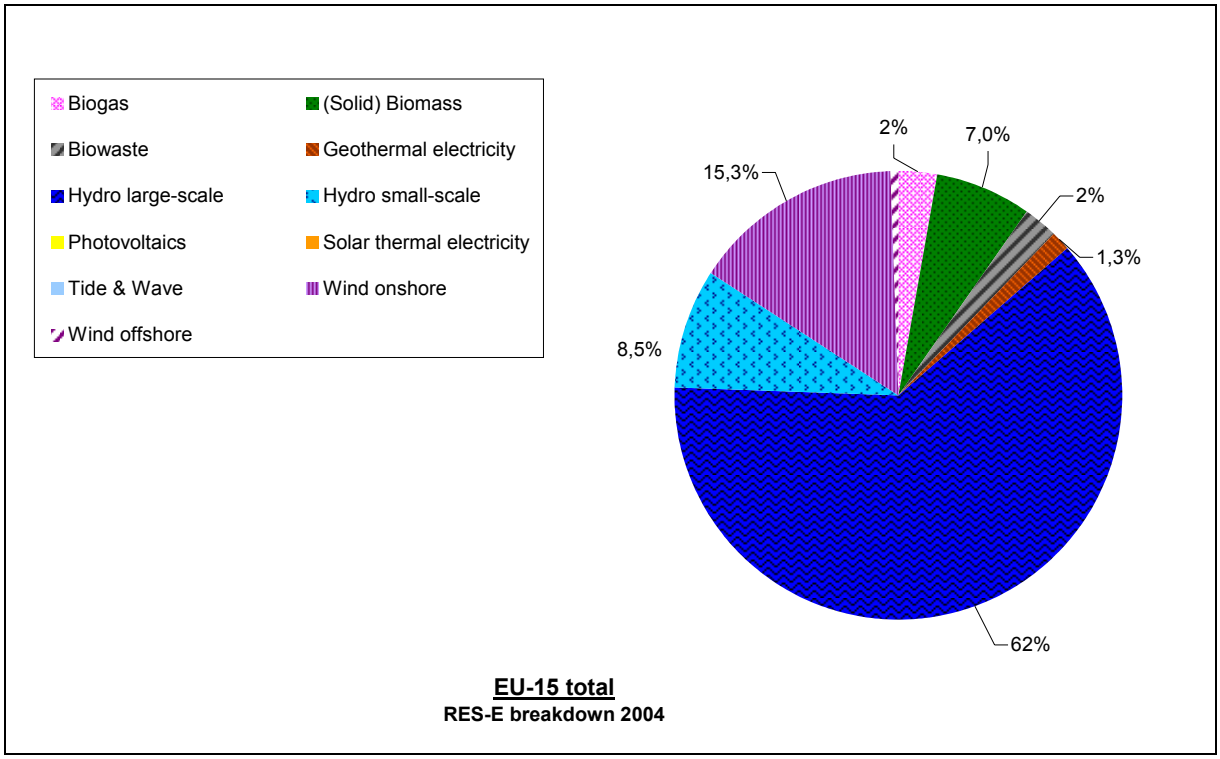

Figure 3:
RES-E as a share of the total achieved potential in 2004 for the EU-15.

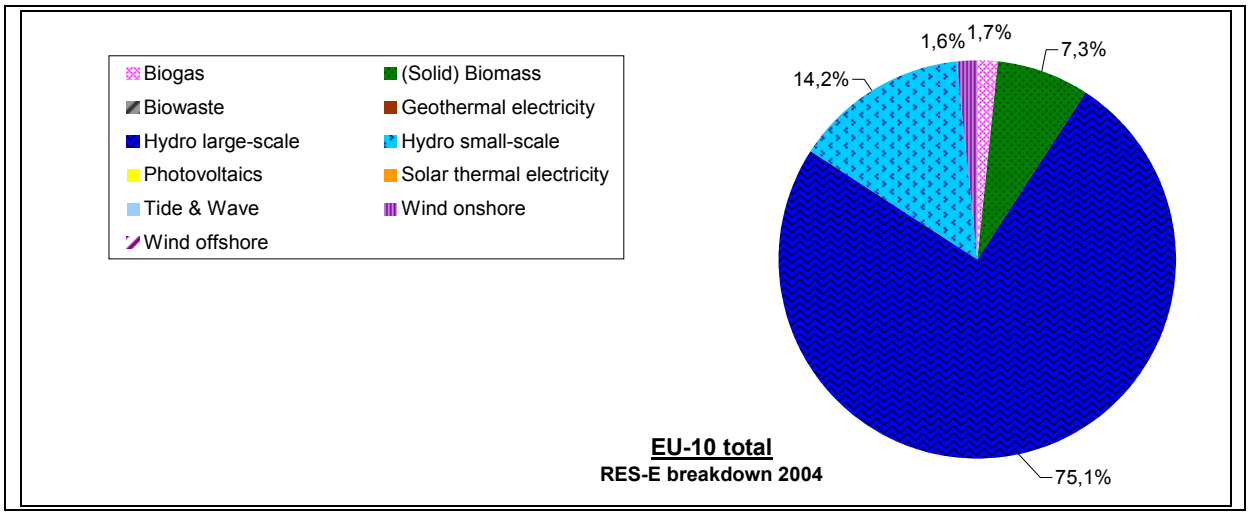

Figure 4:
Breakdown of RES-E in 2004 for the EU-10.

Annex 2 – Inventory of current support systems

Table 1: Overview of the main policies for renewable electricity in EU-15

Country	Main electricity support schemes	Comments
Austria	Feed-in tariffs (now terminated) combined with regional investment incentives.	Feed-in tariffs have been guaranteed for 13 years. The instrument was only effective for new installations with permission until December 2004. The active period of the system has not been extended nor has the instrument been replaced by an alternative one.
Belgium	Quota obligation system / TGC[27] combined with minimum prices for electricity from RES.	The Federal government has set minimum prices for electricity from RES. Flanders and Wallonia have introduced a quota obligation system (based on TGCs) with the obligation on electricity suppliers. In Brussels no support scheme has been implemented yet. Wind offshore is supported at federal level.
Denmark	Premium feed-in tariffs (environmental adder) and tender schemes for wind offshore.	Settlement prices are valid for 10 years. The tariff level is generally rather low compared to the previously high feed-in tariffs.
Finland	Energy tax exemption combined with investment incentives.	Tax refund and investment incentives of up to 40% for wind, and up to 30% for electricity generation from other RES.
France	Feed-in tariffs.	For power plants < 12 MW feed-in tariffs are guaranteed for 15 years or 20 years (hydro and PV). For power plants > 12 MW a tendering scheme is in place.
Germany	Feed-in tariffs.	Feed-in tariffs are guaranteed for 20 years (Renewable Energy Act). Furthermore soft loans and tax incentives are available.
Greece	Feed-in tariffs combined with investment incentives.	Feed-in tariffs are guaranteed for 10 years. Investment incentives up to 40%.
Ireland	Tendering scheme. It has been announced that the tendering scheme will be replaced by a feed-in tariff scheme.	Tendering schemes with technology bands and price caps. Also tax incentives for investment in electricity from RES.
Italy	Quota obligation system / TGC. Anew feed-in tariff system for photovoltaic valid since 5th August 2005.	Obligation (based on TGCs) on electricity suppliers. Certificates are only issued for new RES-E capacity during the first eight years of operation.
Luxembourg	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years (for PV for 20 years). Investment incentives also available.
Netherlands	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years. Fiscal incentives for investment in RES are available. The energy tax exemption on electricity from RES ended on 1 January 2005.
Portugal	Feed-in tariffs combined with investment incentives.	Investment incentives up to 40%.
Spain	Feed-in tariffs.	Electricity producers can choose between a fixed feed-in tariff or a premium on top of the conventional electricity price, both are available over the entire lifetime of a RES power plant. Soft loans, tax incentives and regional investment incentives are available.
Sweden	Quota obligation system / TGC.	Obligation (based on TGCs) on electricity consumers. For wind energy, investment incentives and a small environmental bonus are available.
UK	Quota obligation system / TGC.	Obligation (based on TGCs) on electricity suppliers. Electricity companies which do not comply with the obligation have to pay a buy-out penalty. A tax exemption for electricity generated from RES is available (Levy Exemption Certificates which give exemption from the Climate Change Levy).

[27] TGC = tradable green certificates.

Table 2: Overview of the main policies for renewable electricity in EU-10

Country	Main electricity support schemes	Comments
Cyprus	Grant scheme for the promotion of RES (since February 2004) financed through an electricity consumption tax of 0.22 E/kWh (since Aug. 2003).	Promotion scheme is fixed only for a 3-year period.
Czech Republic	Feed-in tariffs (since 2002), supported by investment grants Revision and improvement of the tariffs in February 2005.	Relatively high feed-in tariffs with 15-year guaranteed support. Producer can choose between a fixed feed-in tariff or a premium tariff (green bonus). For biomass cogeneration, only the green bonus applies..
Estonia	Feed-in tariff system with purchase obligation.	Feed-in tariffs paid for up to 7 years for biomass and hydro and up to 12 years for wind and other technologies. All support schemes are scheduled to end in 2015. Together with relatively low feed-in tariffs this makes renewable investments very difficult.
Hungary	Feed-in tariff (since January 2003) combined with purchase obligation and tenders for grants.	Medium tariffs (6 to 6.8 ct/kWh) but no differentiation among technologies. Actions to support RES are not coordinated, and political support varies. All this results in high investment risks and low penetration.
Latvia	Quota obligation system (since 2002) combined with feed-in tariffs.	Frequent policy changes and the short duration of guaranteed feed-in tariffs result in high investment uncertainty. The high feed-in tariff scheme for wind and small hydropower plants (less than 2 MW) was phased out in January 2003.
Lithuania	Relatively high feed-in tariffs combined with a purchase obligation. In addition good conditions for grid connections and investment programmes.	Closure of the Ignalina nuclear plant will strongly affect electricity prices and thus the competitive position of renewables as well as renewable support. Investment programmes limited to companies registered in Lithuania.
Malta	Low VAT rate for solar.	Very little attention to RES-E so far.
Poland	Green power purchase obligation with targets specified until 2010. In addition renewables are exempted from the (small) excise tax.	No penalties defined and lack of target enforcement.
Slovak Republic	Programme supporting RES and energy efficiency, including feed-in tariffs and tax incentives.	Very little support for renewables. The main support programme runs from 2000, but there is no certainty as to the time frame or tariffs. The low support, lack of funding and lack of longer-term certainty make investors very reluctant.
Slovenia	Feed-in system combined with long-term guaranteed contracts, CO_2 taxation and public funds for environmental investments.	None.

Bulgaria	Combination of feed-in tariffs, tax incentives and purchase obligation.	Relatively low levels of incentive make penetration of renewables especially difficult as the current commodity prices for electricity are still relatively low. A green certificate system to support renewable electricity developments has been proposed. Bulgaria recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.
Romania	Subsidy fund (since 2000), feed-in tariffs.	Normal feed-in tariff modest, but high tariff for autonomous small wind systems (up to 110-130 €/MWh). Romania recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.

Annex 3 – Costs of current support systems and effectiveness

The generation cost for renewable energies shows a wide variation (see Figure 1). Any assessment of support schemes should therefore be carried out for each sector.

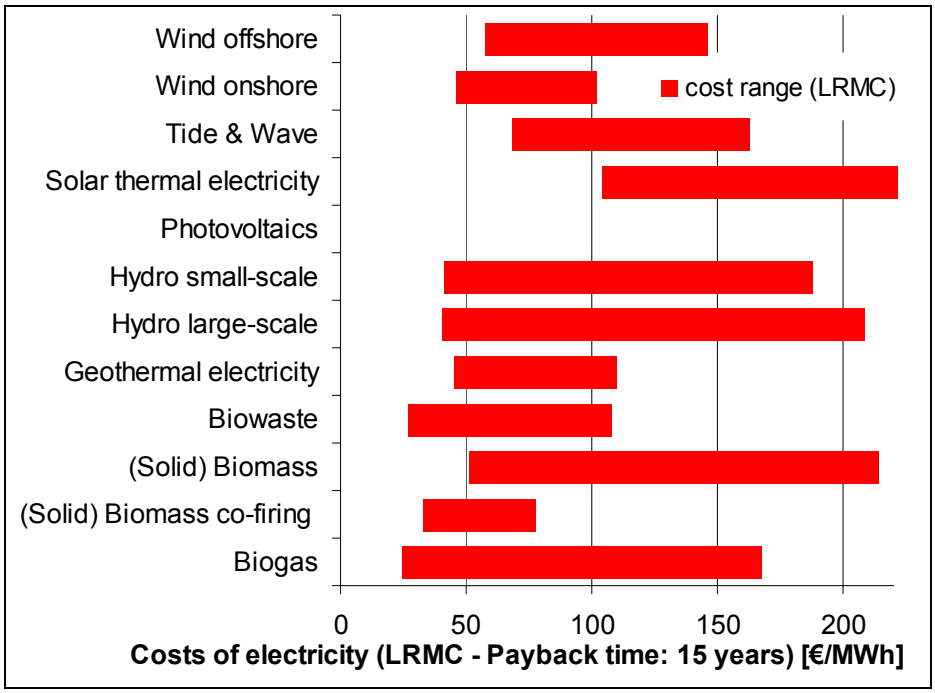

Figure 1:
Cost of electricity generation –Long-run marginal costs (LRMC). Sources: FORRES report.

The **current level of support** for RES-E differs significantly among the different EU Member States. This is due to the different country-specific cost-resource conditions and the considerable differences in the support instruments applied in these countries. In order to compare the prices paid for the different RES-E generation options with the costs in each Member State, both quantities are analysed and shown simultaneously for wind onshore, agricultural biogas, biomass forestry, small-scale hydropower and solar photovoltaic.

Before comparing costs and support levels among the countries, we have to make sure we are dealing with comparable quantities. In particular, the support level in each country needs to be normalised according to the duration of support in each country, e.g. the duration of green certificates in Italy is only eight years compared to 20 years for guaranteed feed-in tariffs in Germany. The support level under each instrument has therefore been normalised to a common duration of 15 years. The conversion between the country-specific duration and the harmonised support duration of 15 years is performed assuming a 6.6% interest rate.

Only minimum to average generation costs are shown because the readability of the graphs would suffer if the upper cost range for the different RES-E were shown as well.

Effectiveness[28] can be defined in simple terms as the outcome in renewable electricity compared to what's remains of the 2020 potential. This means that a country with an 8%

[28] The source of the indicators for Annexes 3 and 4 is the work carried out under the OPTRES contract of the European Commission, Contract EIE-2003-073.

yearly average effectiveness indicator over a six-year period has been delivering 8% of the 2020 potential every year over that period – as is the case for Germany in Figure 5 (wind). Over the complete six-year period, therefore, 48% of Germany's 2020 potential has been deployed.

In more complex terms, effectiveness is defined as the ratio of the change in the electricity generation potential over a given period of time to the additional realisable mid-term potential by 2020 for a specific technology, where the exact definition of effectiveness reads as follows:

$$E_n^i = \frac{G_n^i - G_{n-1}^i}{ADD - POT_{n-1}^i}$$

E_n^i Effectiveness Indicator for RES technology i for the year n

G_n^i Electricity generation potential by RES technology i in year n

$ADD - POT_n^i$ Additional generation potential of RES technology i in year n until 2020

This definition of effectiveness is a measure of the available potentials of a specific country for individual technologies. This appears to be the correct approach since Member State targets as determined in the RES-E directive are based mainly on the realisable generation potential of each country.

The yearly effectiveness of a Member State policy is the ratio of the change of the electricity generation potential in that year compared to the remaining additional realisable mid-term potential until 2020 for a specific technology.

Figure 2 below shows the concept of the yearly effectiveness indicator:

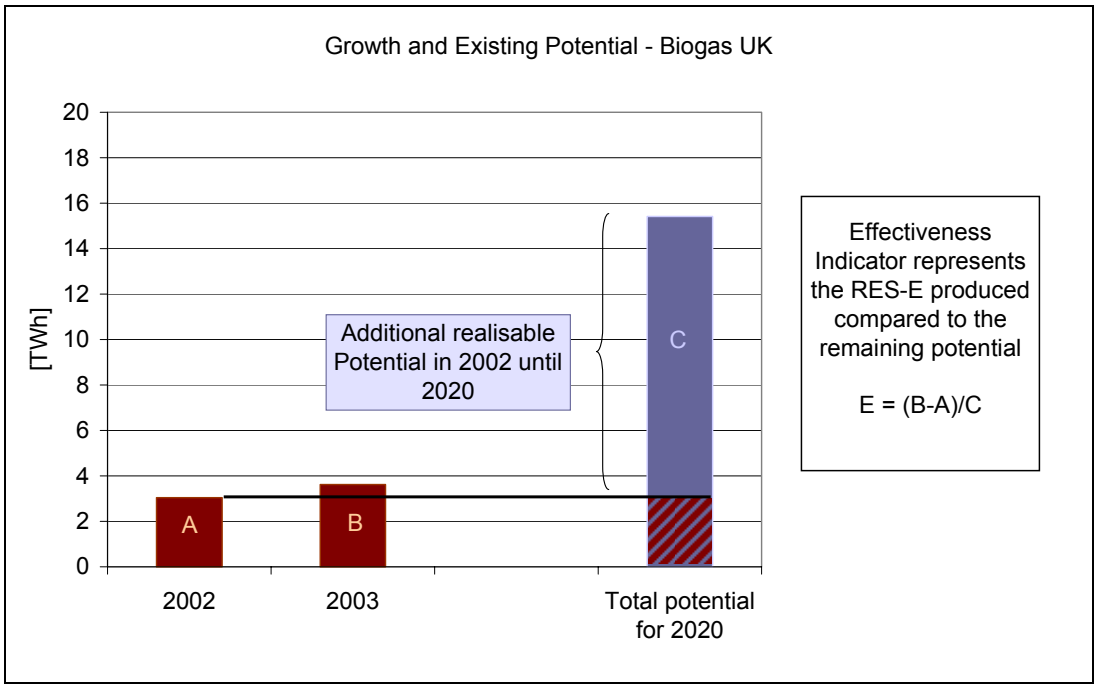

Figure 2: 2003 effectiveness indicator – example biogas in UK

The indicators included in this Communication are calculated in an average period of six or seven years[29]. In figure 2, we show the annual effectiveness indicator for the particular example of biogas in UK for the years 1998 until 2003 as well as the average during the period. The interpretation of this indicator can be pursued as follows: if a country has an average effectiveness indicator of 3% - as indicated by the dot line in figure 3 - it means that it has already mobilised a 17% of its additional potential until 2020[30] in a linear manner.

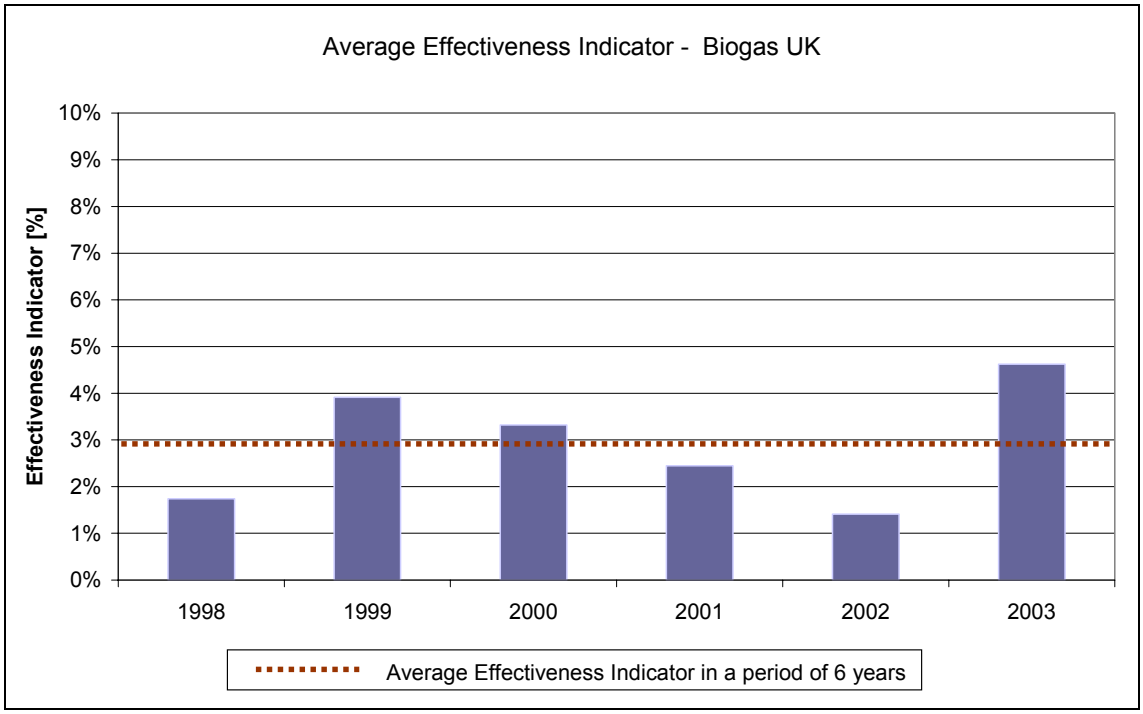

Figure 3: Average effectiveness indicator for the period 1998-2003 –Example biogas in UK

In the following section, effectiveness indicators are shown for the sectors wind onshore and solar photovoltaic for the period 1998-2004, and solid biomass, biogas and small hydro for the period 1998-2003. It must be clarified that in the subsequent section for the period 1997-2003, over which the effectiveness indicator is analysed, a mixed policy is considered in Belgium, France, Italy, the Netherlands, Sweden and the UK.

Wind energy

Figure 4 and figure 6 show the generation cost of wind energy and the level of the supported prices in each country. Support schemes for wind vary considerably throughout Europe with values ranging from €30/MWh in Slovakia to €110 per MWh in the UK. These differences – as seen in Figures 4 and 6 – are not justified by the differences in generation costs. Generation costs are shown in a range based – in the case of wind – on the different bands of wind potential.

[29] The period of seven years applies to the case of wind energy and PV.

[30] As the remaining potential decreases every year that more renewable electricity is generated, the complete figure is 17% instead of 18% (3% x 6 years).

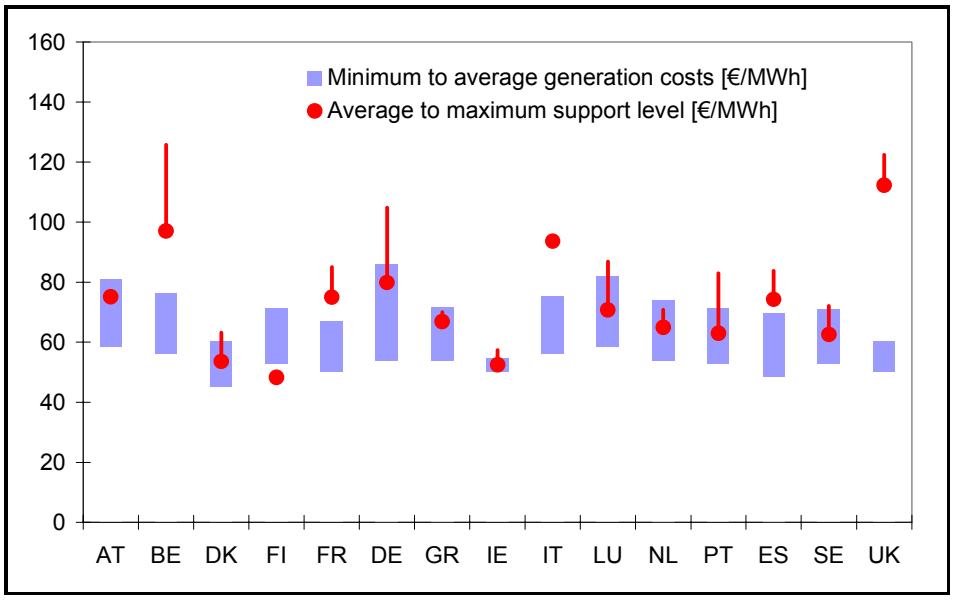

Figure 4:
Price ranges (average to maximum support) for direct support of wind onshore in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). Support schemes are normalised to 15 years.

How effective are these support schemes? The definition of effectiveness has been taken as the electricity delivered in GWh compared to the potential of the country for each technology.

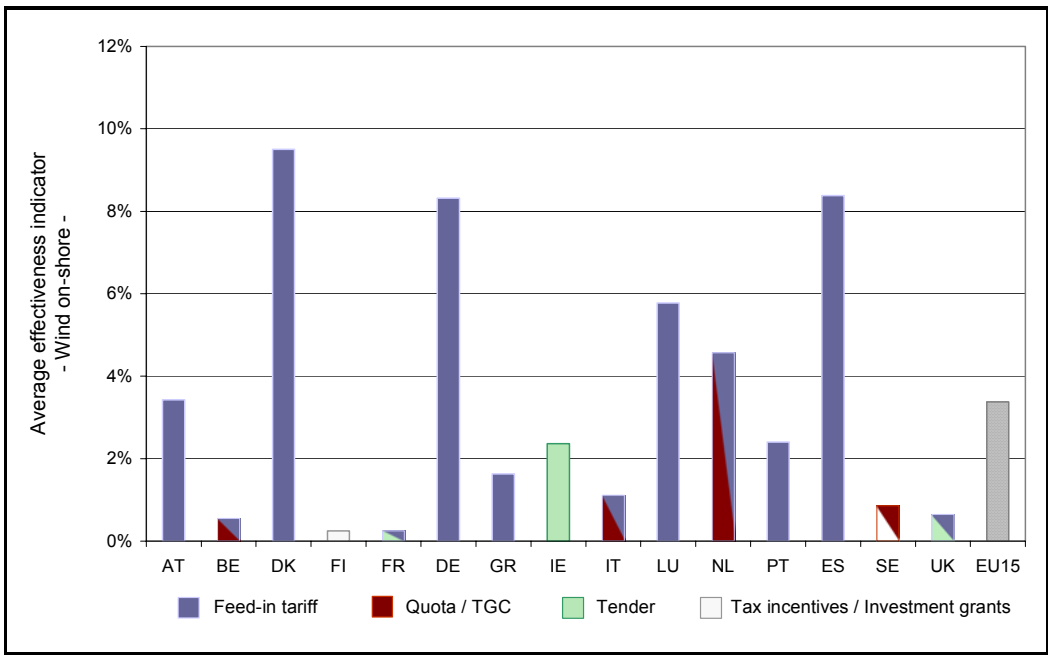

Figure 5:
Effectiveness indicator for wind onshore electricity in the period 1998-2004. The relevant policy schemes during this period are shown in different colour codes.

The three countries that are most effective in delivering wind energy are Denmark, Germany and Spain as can be seen in Figure 5.

Germany applies a stepped tariff with different values depending on wind resources. France uses the same system. This stepped support scheme – although controversial as it does not use only the best potentials – is justified at national level in order to extend potential resources in the country and avoid concentration in one region and hence NIMBY effect. The values used in Figure 4 consider the maximum tariff for Germany[31].

It is commonly stated that the high level of feed-in tariffs is the main driver for investment in wind energy especially in Spain and Germany. As can be seen, the level of support is rather well adjusted to generation cost. A long-term stable policy environment seems to be the key to success in developing RES markets, especially in the first stage.

The three quota systems in Belgium, Italy and the UK, currently have a higher support level than the feed-in tariff systems. The reason for this higher support level, as reflected in currently observed green certificate prices, can be found in the higher risk premium requested by investors, the administrative costs and the still immature green certificate market. The question is how the price level will develop in the medium and long term.

Figure 4 shows the three countries with the lowest support: FI, DK and IE. The situations in these countries are very different. DK has a very mature market with the highest rate per capita of wind installations in the world and current support is concentrated in re-powering[32], while IE has the best wind potential in Europe but only 200 MW installed capacity, and Finland has chosen a policy of biomass promotion and provides too little support to initiate stable growth in wind.

For the EU-10, the comparison of costs and prices for wind onshore as shown in Figure 6 leads to the conclusion that the supported price level is clearly insufficient in Slovakia, Latvia, Estonia and Slovenia, as the level is below marginal generation costs.

The level seems to be sufficient in at least Cyprus and Czech Republic. For countries like Hungary and Lithuania, support is just enough to stimulate investment[33].

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31 Germany wind onshore: tariff €87/MWh (maximum tariff). Duration of support is 20 years. Interest rate: 4.8% (considering the soft loans granted by the German federal government). Wind conditions: 1 750 full load hours (country-specific average).

32 The DK system is now concentrating on re-powering (replacement of old turbines by more efficient ones) and offshore which is not included in this text.

33 For Poland no figures are shown since a green certificate price cannot yet be given.

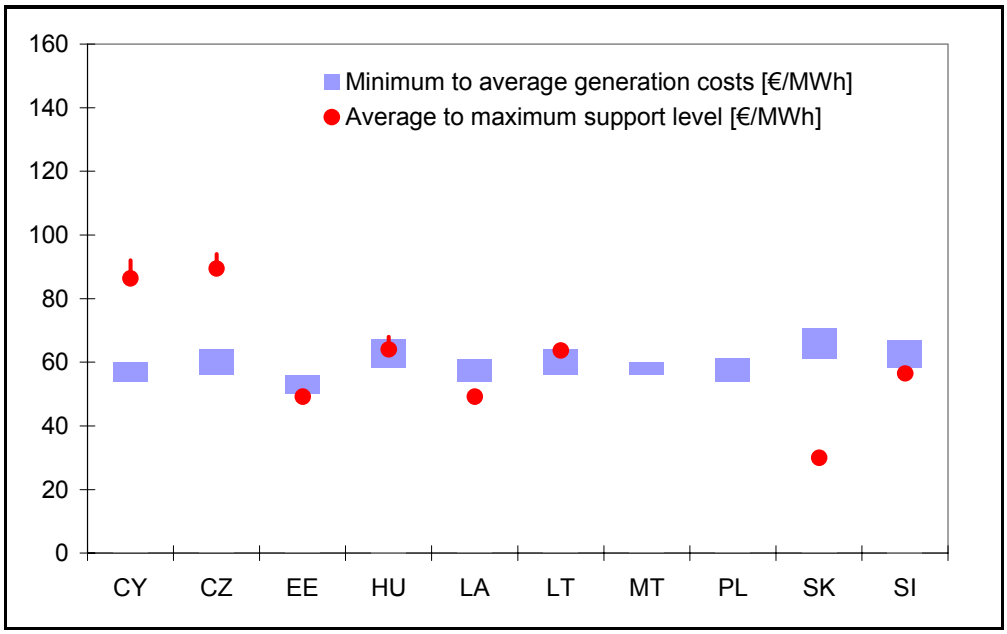

Figure 6:
Price ranges (average to maximum support) for supported wind onshore in EU-10 Member States (average tariffs are indicative) compared to the long term marginal generation costs (minimum to average costs).

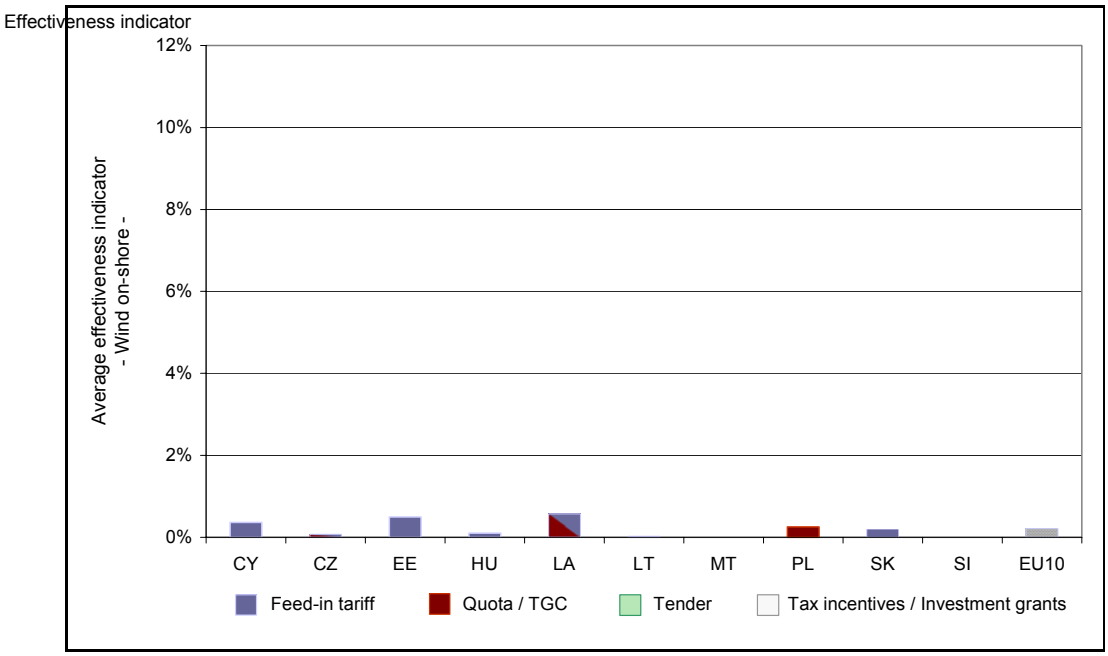

Figure 7:
Effectiveness indicator for wind onshore electricity in the period 1998-2004. The relevant policy schemes during this period are shown in different colour codes.

Biogas[34]

Comparing apples and pears sometimes seems easier than analysing the biomass sector – as the latter is like comparing cows and trees. Biomass is a very complex sector as it covers wastes, products and residues from very different sources: agriculture, forests, cities, animals, etc. Analysis of the support schemes becomes even more complex when 25 countries are considered.

This report is intended to give an overview of two main biomass sectors in Europe: biogas and forest residues.

The different support levels are shown for agricultural biogas electricity generation in Figure 8 for EU-15 and Figure 10 for EU-10. The effectiveness indicators are depicted in Figures 9 and 11.

Among the EU-15 level, the level of promotion in France and Sweden appears to be insufficient when compared to long-run marginal generation costs. Finland clearly does not specifically promote this technology. For Greece, Ireland, and Portugal, the support level is at the lower end of the cost range. In Austria, the tariffs[35] are relatively high with policy aiming to support small-scale agricultural applications (average range of 70-100 kW) as compared to large centralised plants. Germany also promotes small-scale installations with a high effectiveness (Figure 9). UK has a rather high support (TGC + CCL exemption)[36], resulting in a high effectiveness. Denmark has a medium support with a fairly high effectiveness. The Danish support scheme prioritises large central power plants. The Swedish and Finnish tax rebates have been unable to trigger relevant investment in biogas plants. Similarly, the Irish tender rounds seem to have ignored biogas as an option for increasing RES-E generation capacity. It should be noted here that the high growth in Italy and the UK has been based mainly on the expansion of landfill gas capacity, whereas in Austria, Denmark, and Germany agricultural biogas has had a significant share in the observed growth.

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34 Biogas includes all biomass fermentation processes: biogas with co-fermentation, sewage and landfill gas.

35 Paid for new installations until December 2004. The system has now stopped.

36 The total level of support in the UK is about: €110/MWh = €68/MWh certificate price + €6.9/MWh CCL + €36/MWh market price. Before 2002, the UK had different tender rounds for biogas applications.

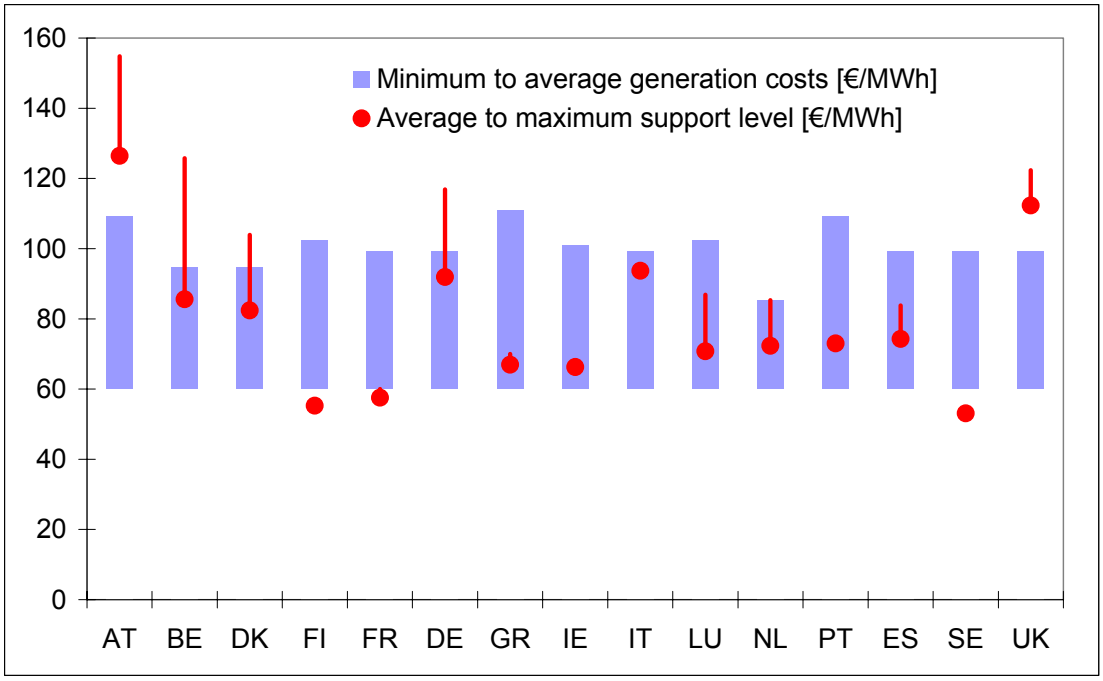


Figure 8:
Price ranges (average to maximum support) for direct support of agricultural biogas in EU-15 member states (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

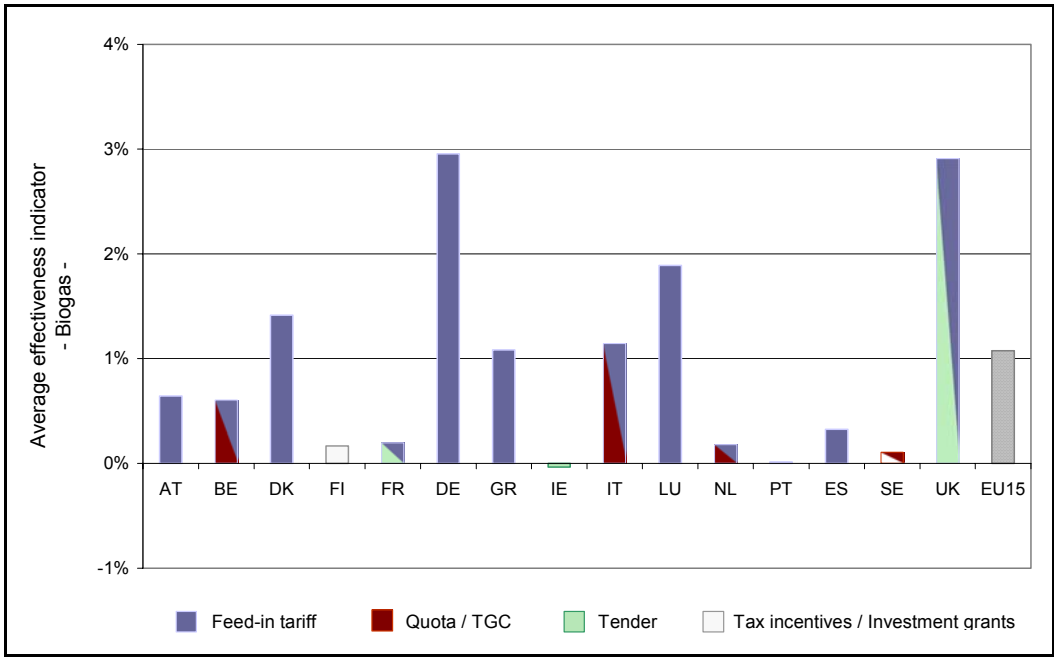


Figure 9:
Effectiveness indicator for biogas electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

The effectiveness of the biogas support level is influenced by the following factors, rather than the choice of support scheme:

- The choice of small or large plants: large plants yield a higher effectiveness. Small plants are supposed to be more important for the rural economy, but the cost is higher.

- The existence of a complementary support scheme. The biogas sector is intimately linked to environmental policy for waste treatment. Countries like the UK support biogas with a secondary instrument such as tax relief (CCL exemption)[37]. A complementary investment aid is a good catalyst for this technology.

- If a country supports agricultural biogas, generation costs are higher but so are environmental benefits. For supporting landfill gas, the cost is 'cheaper' but the environmental benefit is reduced.

- The existence of district heating networks has proved to be an important aspect in the successful development of the biogas sector, e.g. Denmark.

The EU-15 figures lead to the conclusion that, when the feed-in tariffs are set correctly, the support scheme is able to start market development. The green certificate systems seem to need a secondary instrument (based on environmental benefits) for a real market effect.

The picture for the new Member States looks rather different from the EU-15. For most EU-10 countries, the supported price is low compared to the long-run marginal generation costs. Except in the Czech Republic and Slovenia, financial support is insufficient to trigger significant investment into biogas technology. Effectiveness is nearly zero due to the lack of sufficient support.

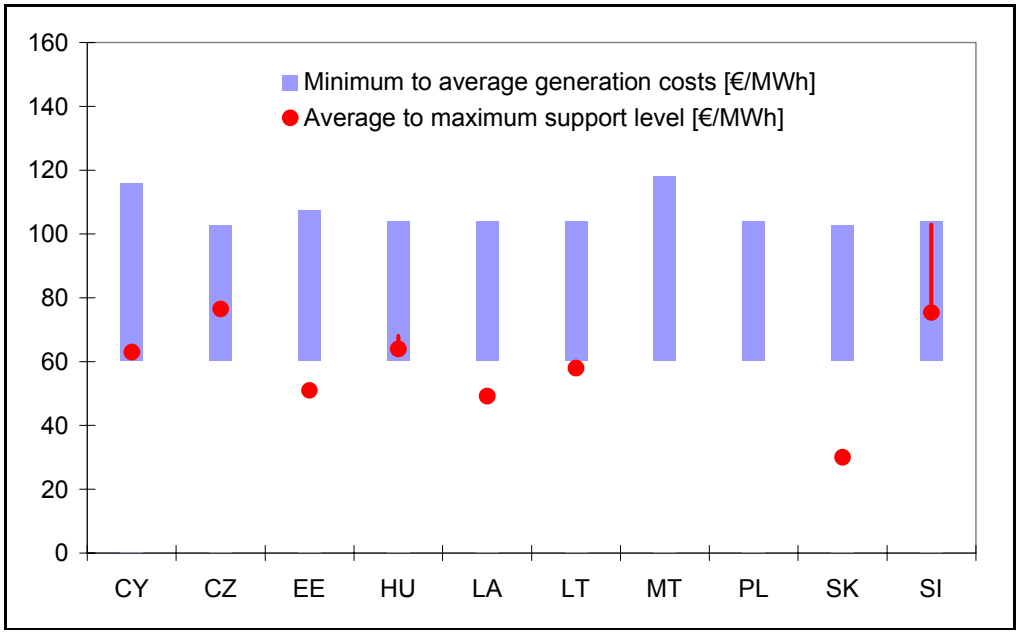


Figure 10:
Price ranges (average to maximum support) for supported agricultural biogas in EU-10 member states

[37] The total level of support in the UK is about: €110/MWh = €68/MWh certificate price + €6.9/MWh CCL + €36/MWh market price. Before 2002, the UK had different tender rounds for biogas applications.

(average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

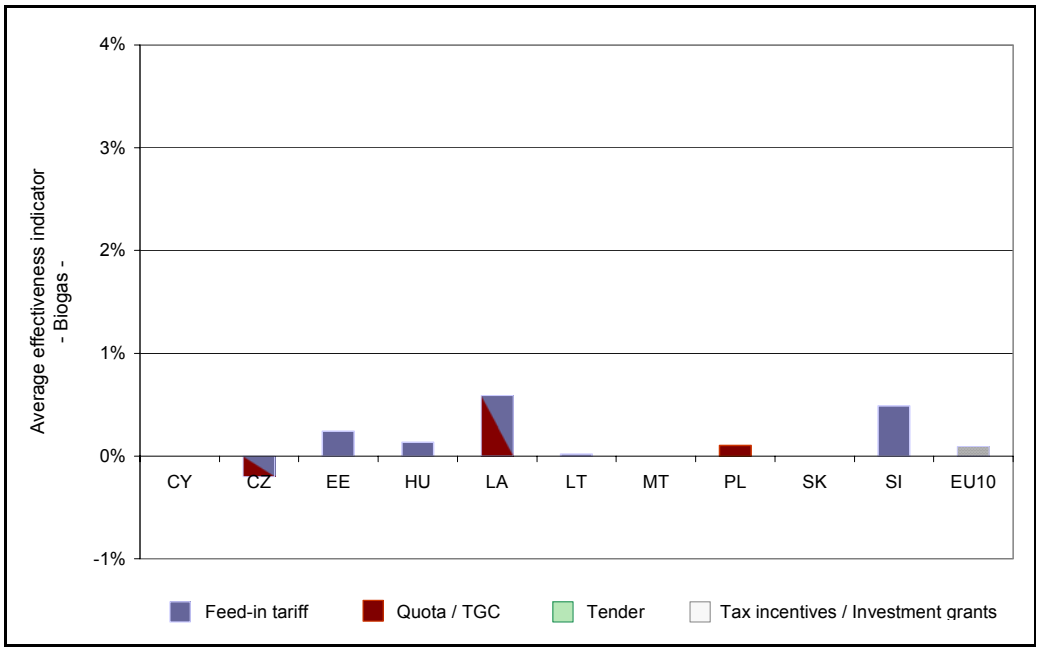


Figure 11:
Effectiveness indicator for biogas electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

Biomass/forestry residues

Before any analysis is carried out, the complexity of this sector should be recalled as it includes small combined heat and power systems, the big pulp and paper industry, the co-firing of wood residues, etc.

Figures 12 and 13 show the differences between support schemes around EU-15 and also the variation in generation costs[38]. The level of Member States support in the EU-10 is generally relatively lower than in the EU-15.

[38] The support for combined heat and power (CHP) is not included in this figure.

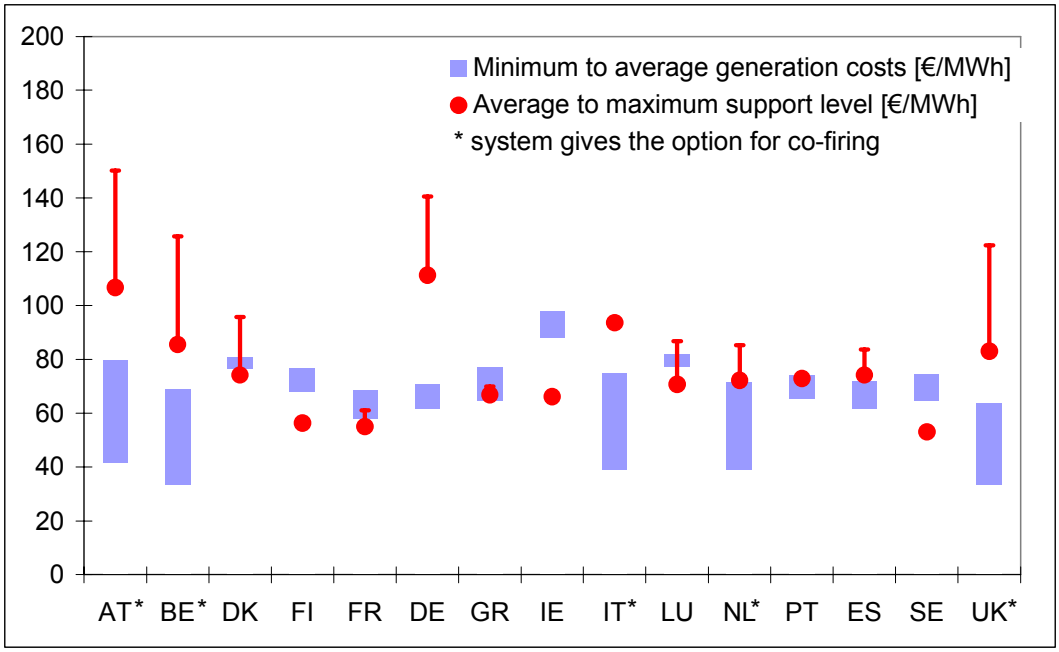


Figure 12:
Price ranges (average to maximum support) for supported biomass electricity production from forestry residues in EU-15 member states (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

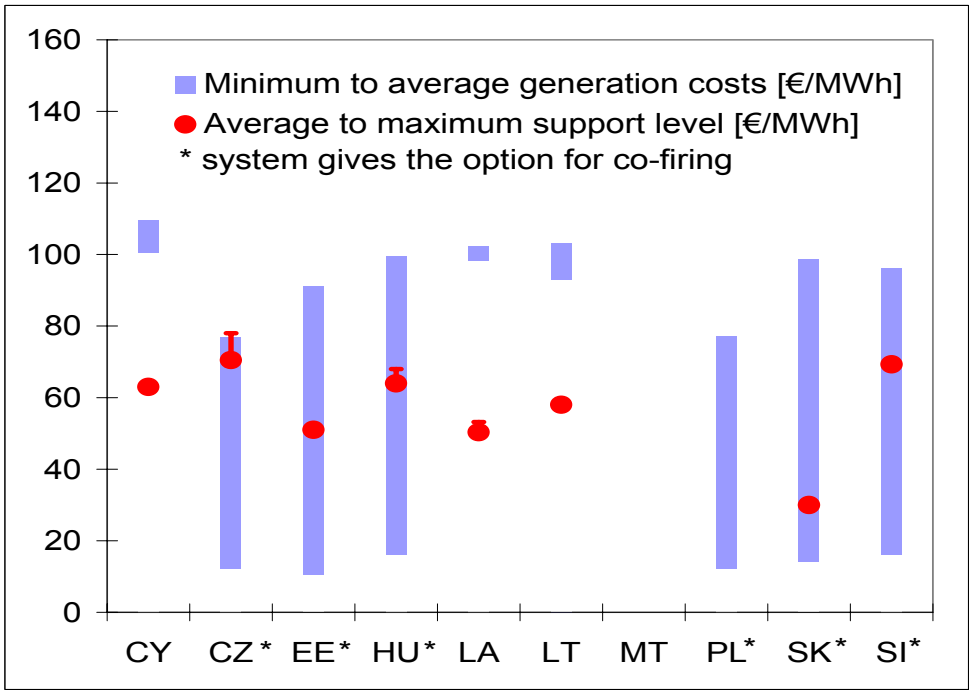


Figure 13:
Price ranges (average to maximum support) for supported biomass electricity production from forestry residues in EU-10 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

* = *countries with co-firing.*

Figures 14 and 15 show the effectiveness of RES support for electricity produced from **solid biomass**. The first conclusion is that at EU-15 level, only a small part of the available

potential was exploited on an annual basis during the period 1998-2003. The effectiveness indicator for solid biomass electricity is significantly lower compared with wind exploitation[39]. This confirms the conclusion of the Communication of May 2004[40] that the development of biomass electricity is lagging behind expectations at EU level.

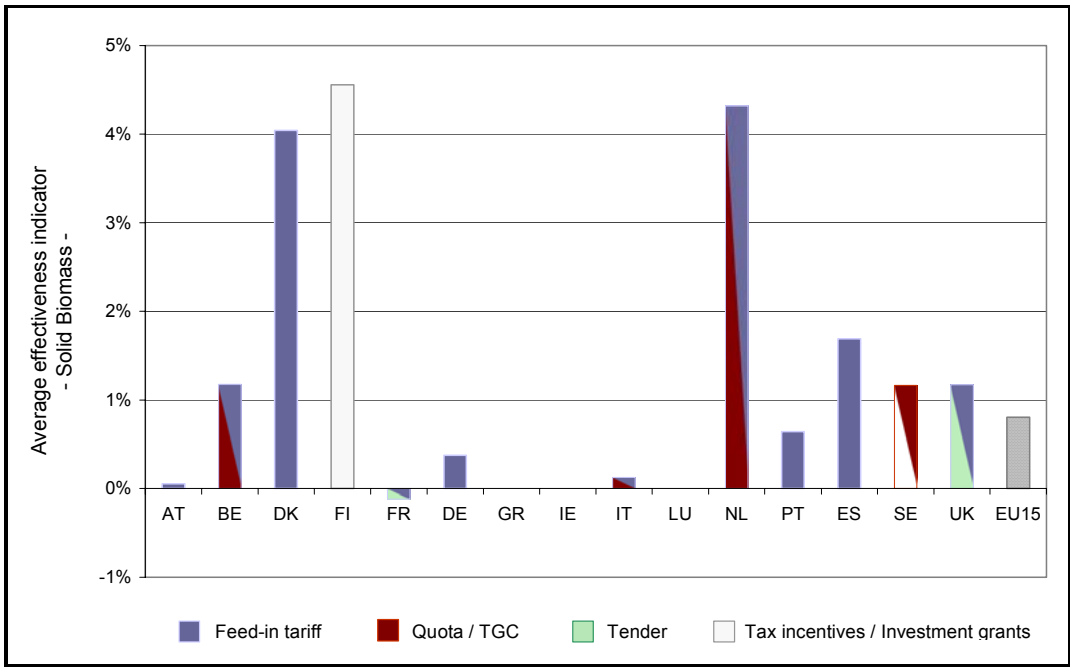
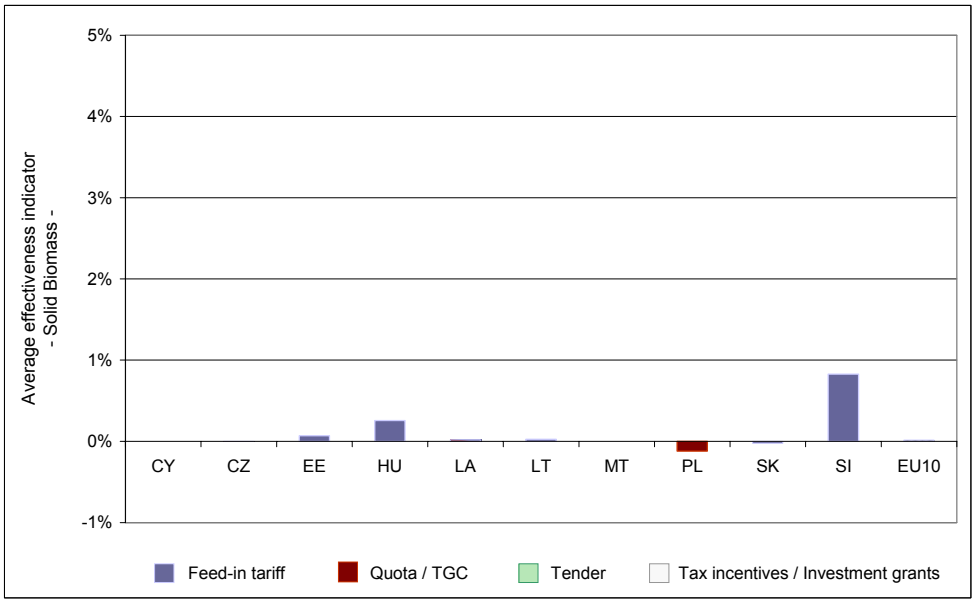


Figure 14:
Effectiveness indicator for biomass electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.



39 Countries with a high effectiveness in wind energy have an indicator between 6-8%. For biomass, the top figures are around 4%.

40 Communication on the share of renewable energy in the EU - COM(2004) 366.

Figure 15:
Effectiveness indicator for biomass electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

It must be clarified that, for Denmark, Figure 14 covers not only forest residues but also straw, which represents half of their solid biomass market. The figure for the Netherlands also includes the co-firing of palm oil, which in 2003 represented 3% of the total solid biomass market.

Denmark saw strong growth in biomass until 2001 with large centralised CHP plants, initiated by the relatively high feed-in tariffs and a stable policy framework.

In the Netherlands, a partial tax exemption was introduced in July 2003 for a feed-in tariff system. Additional support was given by investment grants. Co-firing is the main technology in NL. It is highly likely that the Netherlands will already reach their 9% target for 2010 by 2006.

In Finland, the tax refund for forestry chips has been the main driver of market growth in recent years. An additional 25% investment incentive is available for CHP plants based on wood fuels. The key element in the success of this mix of tax relief and investment incentives is the important traditional wood and paper industry.

In 2002, Sweden switched from investment grants to a TGC system and tax refunds.

Austria and Germany have chosen a policy of medium- and small-scale biomass installations, which has higher costs but is driven not only by energy policy but also by environment and rural development considerations.

The new German support system shows a larger gap between support and generation costs. This new level was adopted in August 2004. Effectiveness in the biomass forestry sector needs still to be demonstrated in this country.

The main barriers to the development of this RES-E source are both economic and infrastructural. Denmark, Finland and NL show the best effectiveness and a smaller gap between support and generation costs. Denmark and the Netherlands have implemented feed-in tariffs and Finland has tax relief as the main support scheme. The common characteristic in these three countries is that centralised power stations using solid biomass attract the largest share of RES-E investment.

Nevertheless, biomass features a large band of options, uses and costs. The promotion of large biomass installations should not ignore promising technology options with a significant potential for technology learning.

To conclude on this sector:

- In UK, BE, IT and to some extent SE, the level of support is just enough. Nevertheless, it looks like that the biomass sector is not yet able to cope with the risk of green certificate schemes.

- Denmark, Finland and NL show the best effectiveness and the smallest gap between support and generation costs. Denmark and the Netherlands have implemented feed-

in tariffs and Finland has tax relief and 25% investment support. Centralised power stations using solid biomass attract the largest share of RES-E investment.

- In France, Greece, Ireland, Luxembourg, Portugal and Spain, the feed-in tariff support is not enough to bring about a real take-off in the biomass sector.

- Secondary instruments especially small investment-plant support and tax relief are good catalysts for kicking off biomass. They also have the advantage of less interference with the wood market.

- CHP support is very good for the biomass development, adding higher energy efficiency.

- It is not a matter of demand: good management of agriculture and forest residues is an important factor for good biomass exploitation.

Hydropower

As our third example, we provide the same analysis for **small-scale hydropower**. In this case, country-specific costs show very large differences. The technology is also especially relevant for some of the new member states. Again, it can be seen that existing feed-in tariffs are quite well adjusted to the costs of generation, with the Austrian and the Portuguese tariffs at the lower end of the cost spectrum. The Finnish tax measure is again unable to cover the costs needed to stimulate investment in new generation capacity. Very good financial conditions for small hydropower exist in France and in Slovenia. For Cyprus, the support level might be higher than shown in the figure, since additional investment grants are not considered.

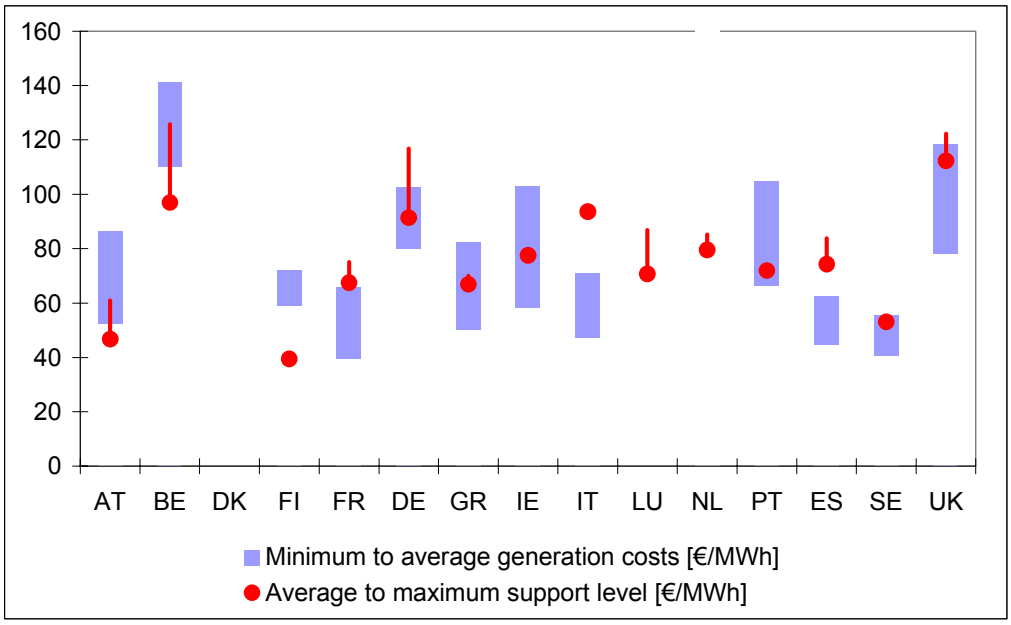


Figure 16:
Price ranges (average to maximum support) for direct support of small-scale hydro in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

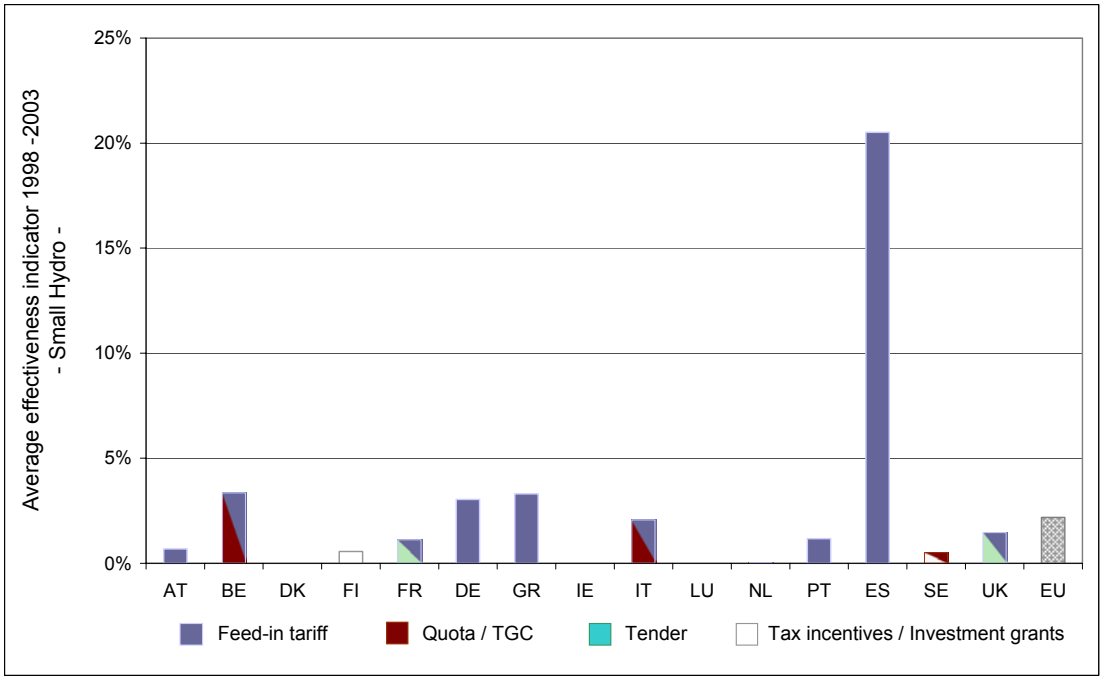


Figure 17:
Effectiveness indicator for small hydro electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

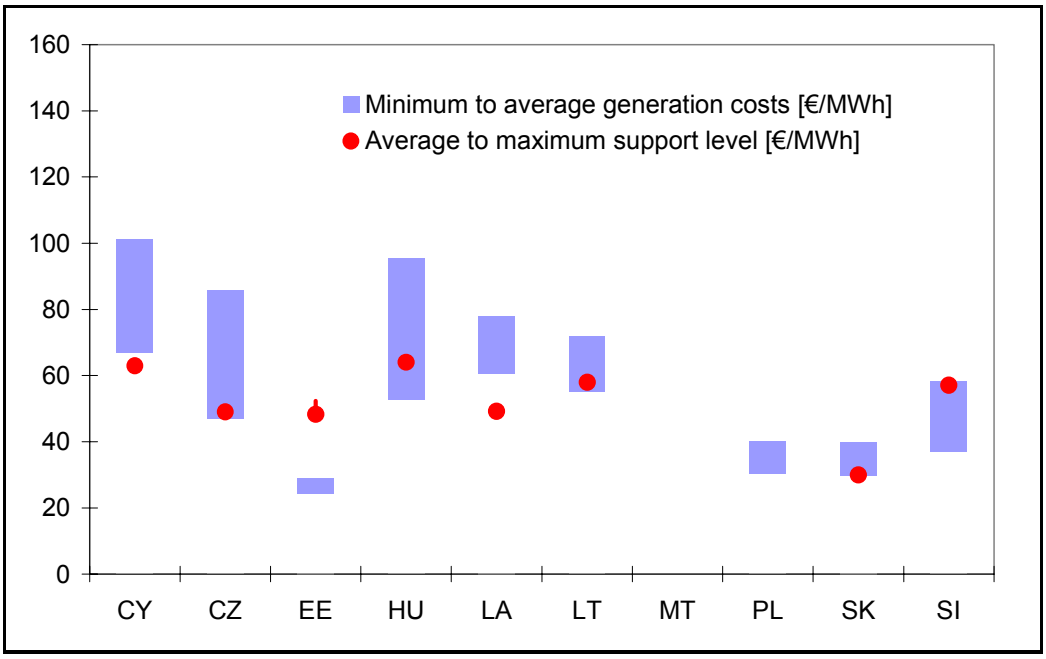


Figure 18:
Price ranges (average to maximum support) for direct support of small-scale hydro in EU-10 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

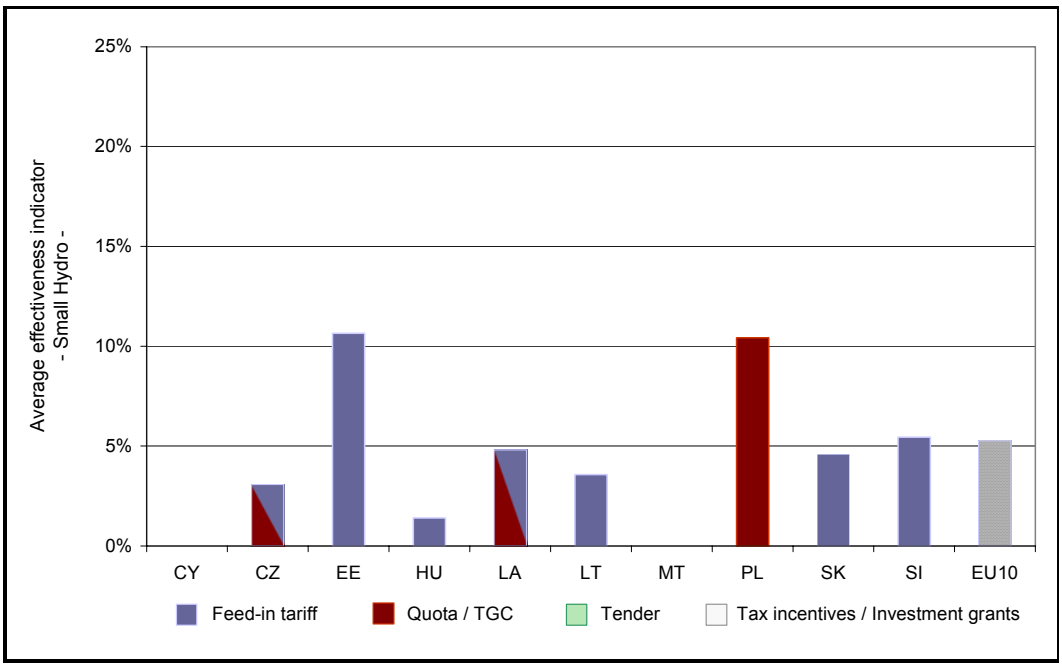


Figure 19:
Effectiveness indicator for small hydro electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

Photovoltaic solar energy

As can be seen from Figure 21, photovoltaic electricity generation showed the strongest growth in Germany[41] followed by the Netherlands and Austria over the period considered. The support system in these three countries consists of fixed feed-in tariffs supplemented by additional mechanisms such as the soft loans in Germany. As expected, quota obligations and tax measures provide little incentive for investment in PV technology, since these schemes generally promote only the cheapest available technology. The PV support scheme in DE, NL, ES and AT is implemented as part of a long-term policy for the market development of this technology.

41 DE has just become the world leader, overtaking Japan.

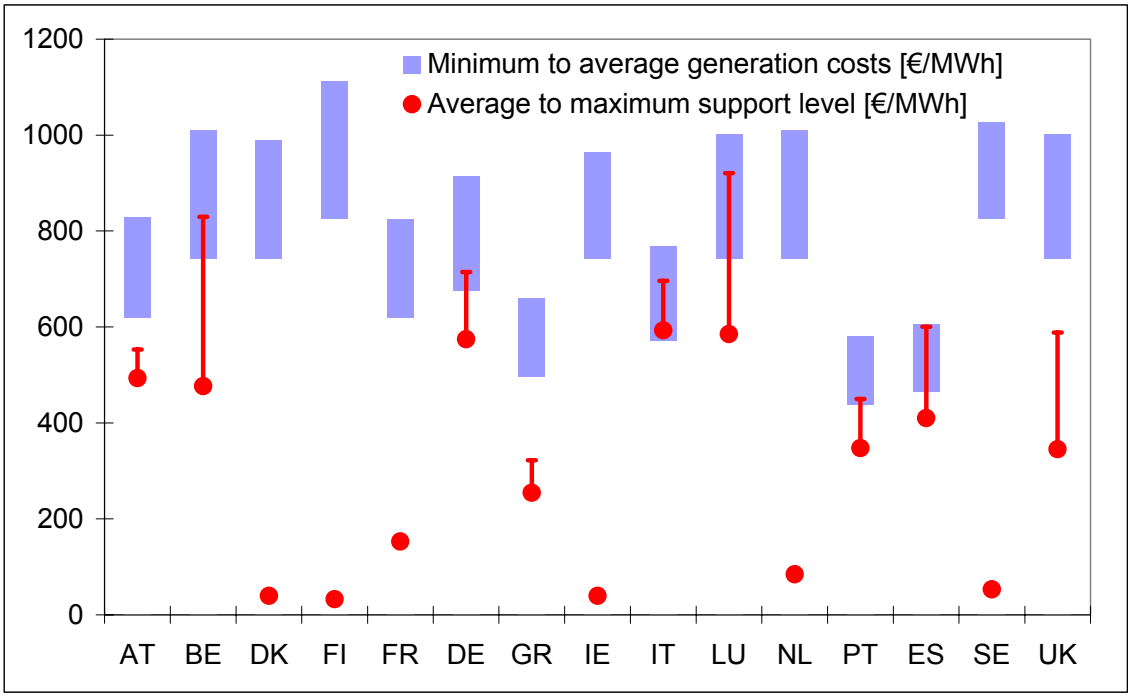


Figure 20:
Price ranges (average to maximum support) for direct support of photovoltaic electricity in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

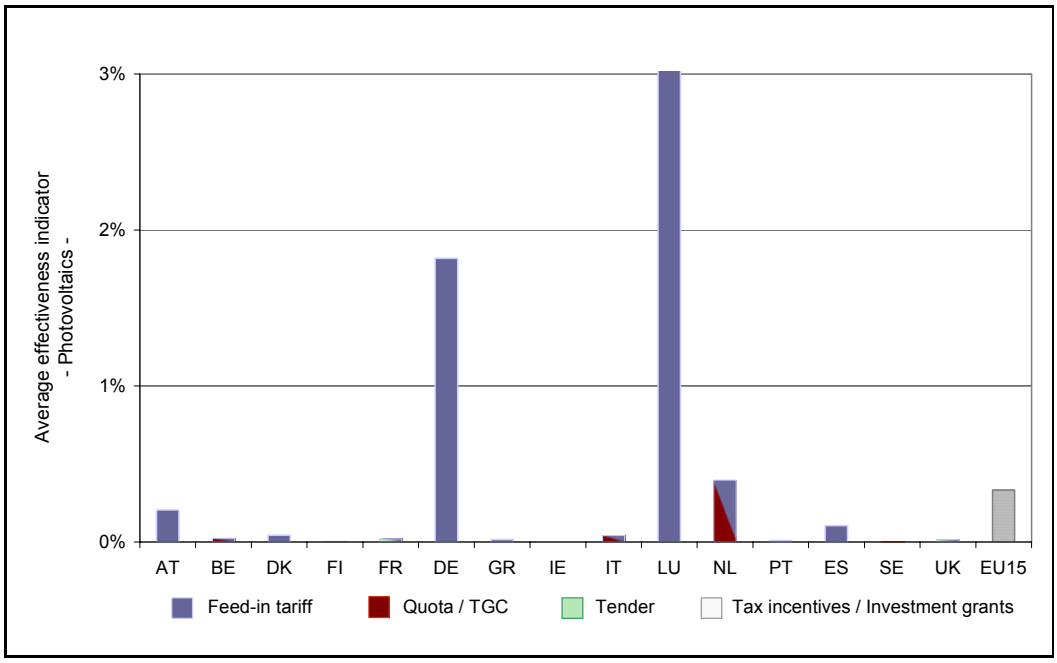


Figure 21:
Effectiveness indicator for photovoltaic electricity in the period 1998-2004. The relevant policy schemes during this period are shown in different colour codes.

Annex 4 – Methodology for the investor's perspective

We define the effectiveness of a member state policy in the following as the ratio of the change in electricity generation potential during a given period of time to the additional realisable mid-term potential by 2020 for a specific technology, where the exact definition of effectiveness reads as follows:

$$E_n^i = \frac{G_n^i - G_{n-1}^i}{ADD - POT_{n-1}^i}$$

E_n^i Effectiveness Indicator for RES technology i for the year n

G_n^i Electricity generation potential by RES technology i in year n

$ADD - POT_n^i$ Additional generation potential of RES technology i in year n until 2020

Annuity

One possible approach for calculating actual support over the entire lifetime from an investor's perspective is to determine **the average expected annuity of the renewable investment.** The annuity calculates the specific discounted average return on every produced kWh by taking into account income and expenditure throughout the entire lifetime of a technology.

$$A = \frac{i}{(1-(1+i)^{-n})} * \sum_{t=1}^{n} \frac{Income_t - Expenditure_t}{(1+i)^t}$$

A= annuity; i=interest rate; t=year; n=technical lifetime

The average expected annuity of wind energy investment for Germany, Spain, France, Austria, Belgium, Italy, Sweden, the UK and Ireland is calculated based on the expected support level during the period of promotion. The level of support in the German system is annually adjusted according to the degression implemented in the German EEG. For the four countries using quota obligation systems, the certificate prices of the year 2004 are extrapolated for the entire active period of support.[42] Furthermore, an interest rate of 6.6% is assumed[43] and country-specific prices of wind technology are used, taking the average market prices of wind turbines in those countries in 2004. Therefore, the expected annuity considers country-specific wind resources, the duration the support is given as well as additional promotion instruments, such as soft loans and investment incentives. An important limitation of this approach is that an estimate of the future evolution of certificate prices in quota systems is needed. Such an estimate typically does not exist. We therefore assume that TGC prices will remain constant at 2004 levels.

[42] This assumption might be questionable because certificate prices might reduce as the certificate markets in those countries mature. However, only very little knowledge exists about the temporal development of prices in these markets.

[43] For Germany only, an interest rate of 4% was used based on the soft loans granted.

In this section, a comparison of profits from an investor perspective and effectiveness has been made for a limited number of Member States and assumping current prices over a longer period.

Therefore, the effectiveness indicator as defined in Annex 3 is shown against the expected annuity of investment in wind and biomass energy for each country. In this way one can correlate the effectiveness of a policy with the average expected annuity of investment. This gives an indication as to whether the success of a specific policy is primarily based on the high financial incentives, or whether other aspects have a crucial impact on market diffusion in the considered countries.

Wind energy

This analysis has been carried out only for a selection of countries in order to show the principal differences between the different policy schemes. The reference year for both the effectiveness indicators and the expected annuity is 2003. This analysis covers the country-specific costs of generation and the duration of payments. Furthermore, country-specific wind yields are used to calculate the income generated during the lifetime of plants.

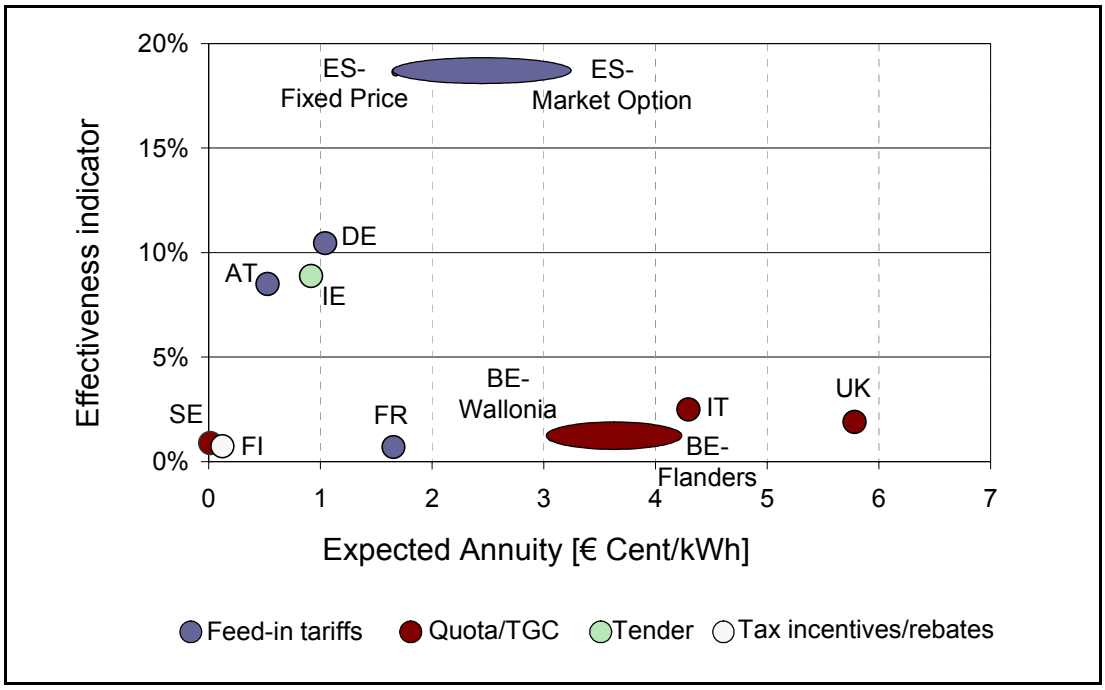


Figure 1: Historically observed efficiency of support: effectiveness indicator in relation to the expected annuity. WIND.

Forestry Biomass

The same analysis has been carried out for electricity generation from biomass. However, the biomass sector is influenced by other factors, such as secondary instruments[44], the combination of heat and electricity generation or an optimal forest management.

The final result of this exercise, carried out for the year 2003[45], is shown in Figure 2.

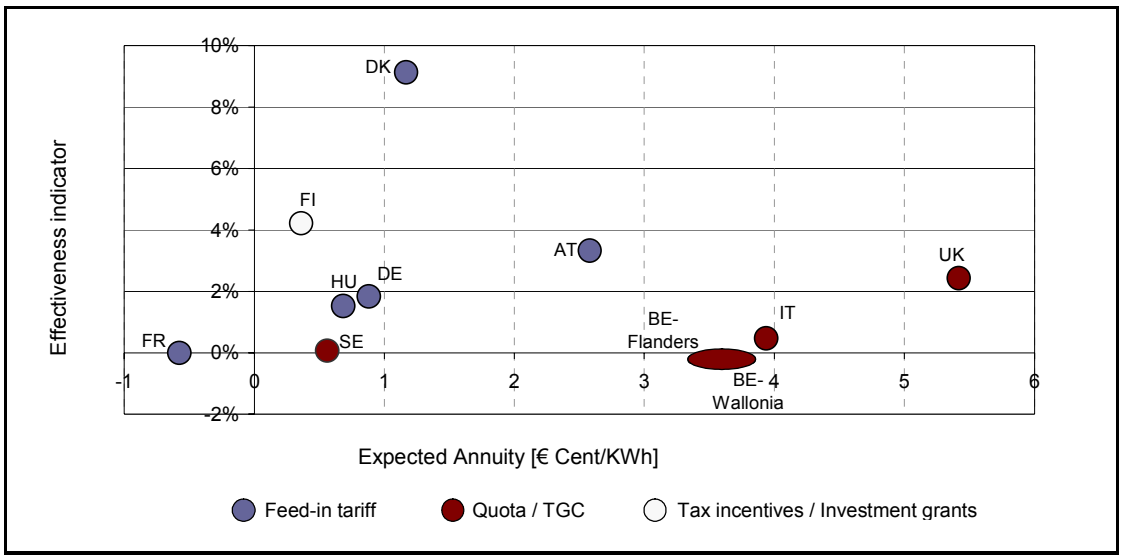


Figure 2: Historically observed efficiency of support: effectiveness indicator in relation to the expected annuity. BIOMASS
The economic data regarding investment costs and operation and maintenance costs are based on biomass electricity generation using CHP[46] technologies. The sale of heat as a by-product is therefore also taken into account for the economic assessment.

44 Some Member States 'reinforce' the main instrument (normally feed-in tariff or green certificate) by tax relief or investment support. These instruments are good ways of catalysing the kick-off of biomass. They also have the advantage of less interference with the wood market.

45 Again, as in the case of wind, the reference year for both effectiveness indicators and the expected annuity is 2003.

46 CHP = Combined Heat and Power generation.

Annex 5 – Intermittency in production and balancing power: need for an appropriate combination of internal market and renewables regulation

As previously stated in Chapter 3.3, balancing costs will of course depend on the volume of intermittent power that has to be balanced, which again depends on the prediction of renewable production, gate closure etc. Moreover, the cost will also depend on the availability of balancing power, which will in turn depend on the generating system (energy mix) and interconnectors to other countries. As said before, an appropriate forecast of wind generation so as to minimise deviations will optimise system costs and regulation services. Under certain conditions, RES-E integration can match with local and regional demand peaks (e.g., solar energy with respect to peaking and grid-destabilizing air-condition demand in Mediterranean countries during daytime.

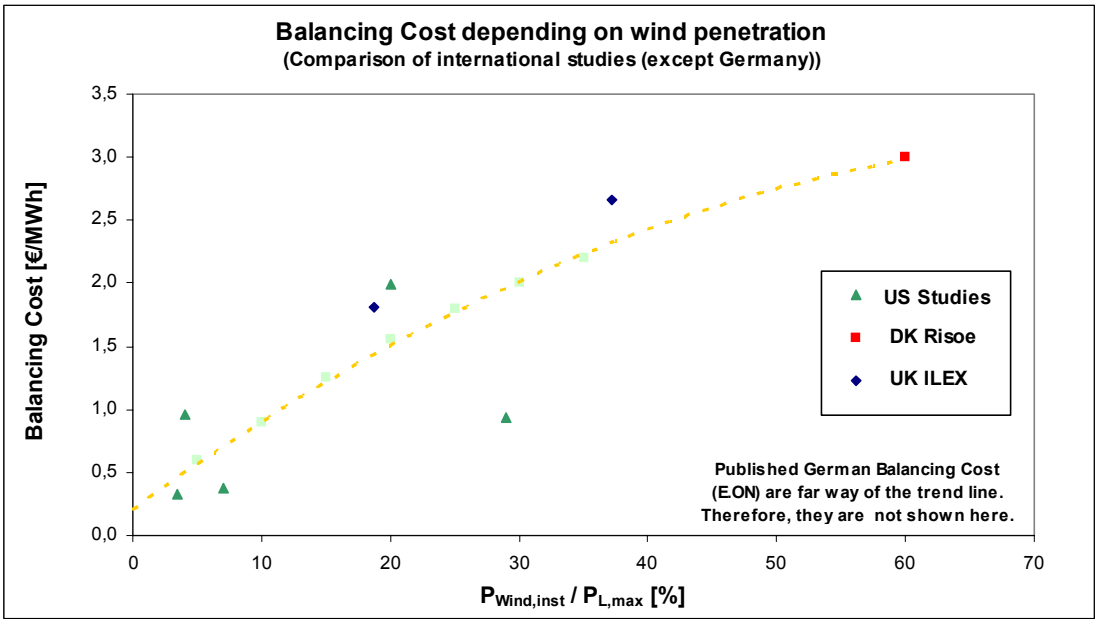


Figure 1:
Comparison of international studies on additional balancing cost due to large-scale intermittent wind integration.

It should be stressed that most existing power markets are designed to cater to the needs of conventional thermal and hydropower, and therefore only to a very limited degree take into account the needs of new renewables. At EU level, therefore, the need for rules and other measures to integrate intermittent RES-E technologies should be considered.

The influence of wind power on cross-border bottlenecks between Germany and its neighbours has created some disturbances in the Netherlands and Poland. Arrangements for power plant scheduling, the possible rigidity of the structure of electricity market, reserve capacity for cross-border transmission and congestion management seem to be crucial points requiring further analysis.

If developed in a more intensive manner, demand flexibility can also handle some of the fluctuations in power production from intermittent sources. At the same time, this flexible demand which could ensure a better balance between supply and demand, may offer advantages not only for integrating RES-E capacity, but also for the general operation of a liberalised power market.

How is the cost of support systems reflected in the electricity tariff? The consumer's point of view.

The transparency of consumers of the different support systems depends almost entirely on the design of the system, especially the flexibility of the market. The majority of countries in the EU do not give the explicit cost of renewable energies in electricity bills.

The transfer of the cost of renewable electricity depends on national regulation aspects and the tariff structure.

The structure of the electricity market and the design aspects are very different in Europe, so the following graph should be considered an estimate of the inclusion of RES support in electricity prices. The cost of the renewable support systems as reflected in the tariff is between 4% and 5% for Germany, Spain and UK and around 15% for Denmark. The share of renewable electricity in Denmark is currently higher than 20%.

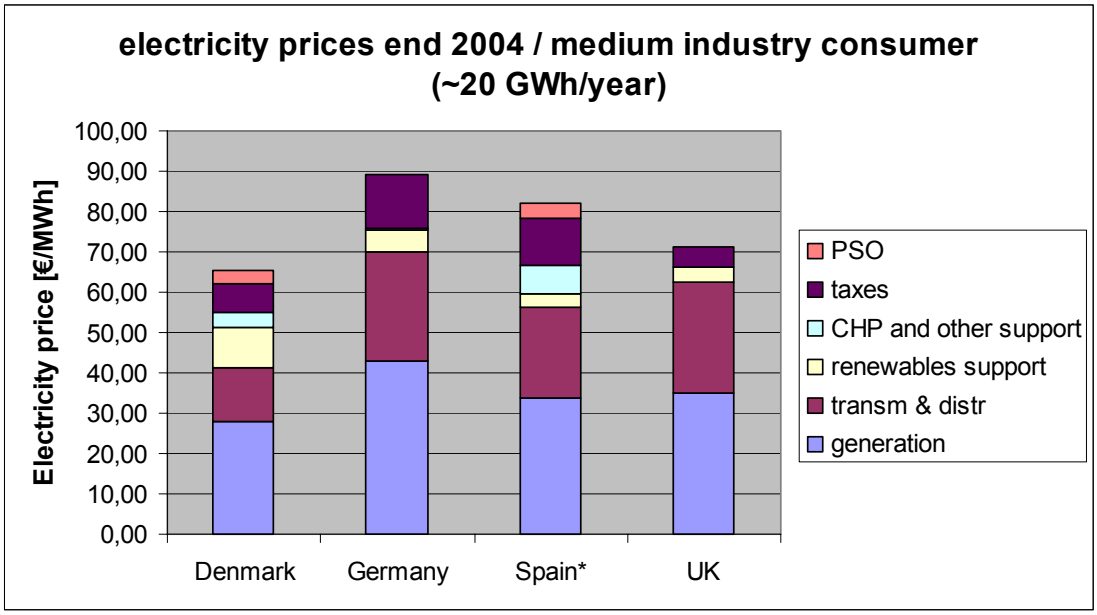


Figure 2: Approximate breakdown of electricity prices. European Commission, own estimation[47]. * No tax is considered for Spain.

[47] The structure of the electricity tariff varies between countries in Europe. The figures included in this table are based on data from Member States and further elaborated by Commission services in order to compare different countries.

Annex 6 – Administrative barriers

Many Member States recognise the problem that renewable energies come in many cases under different codes and legislations. This multiple regulation leads to extra work for both applicants and the authorities concerned.

Complex legislation concerning renewable projects:

- Spatial planning laws involve competent authorities at different hierarchical levels (e.g. central, provincial and local government); civil construction works law and building codes involve local government as the competent authority.
- Environmental laws justify a favourable environmental impact assessment for granting environmental permits.
- Noise disturbance laws (in the case of wind) are intended to limit noise 'pollution'. Competent authorities are typically at local and/or provincial level.
- Nature diversity laws aim at protecting indigenous plants and animals, notably birds. The competent authority is typically central government.
- Laws for the management of water and road infrastructure seek to protect and promote the efficient use of public infrastructure. The competent authority is central government. (More problematic in the case of small hydropower plants).
- Electricity laws governing the transmission, distribution and supply of electricity.

Pre-planning: the experience in Denmark and Germany

In the 90s, more systematic planning procedures were initially developed at national level in Denmark, with directives for local planners. In addition, an executive order from the Minister of Environment and Energy ordered municipalities to find suitable sites for wind turbines through the country. This **"pre-planning"** with public hearings in advance of any actual applications for turbine sites was a considerable help in gaining public acceptance of subsequent sites for wind turbines.

Around 1997, another set of planning regulations were developed for offshore wind farms, with a central, national authority, the Danish Energy Agency, designated to hear all interested parties, public and private. This **"one-stop shop**" method has facilitated the planning process considerably, and is being widely studied around the globe.

In Germany, under the principle of proportionality, small projects may be authorized by the local authorities. Large projects are subject to authorization by a national body under the Federal Emission Control Act (BImSchG).

Under the national building code (Federal Building Code, BauGB), wind power installations are privileged and therefore generally permitted outside residential areas. However, the *Länder* (Federal states) can designate specific areas in which wind energy use is restricted.

Success rates and average approval timing – a good evaluation method

The British Wind Energy Association publishes overall planning approval rates. From the outset, the approval rate in the UK as a whole has been around 80%. The statistics also include figures for different parts of the UK: Scotland has had an approval rate of over 90% compared with less than 20% in Wales. The time taken to decide on wind farm applications is also publicly available: this is currently around 13 months for local decisions and over 2 years for national or federal decisions.

Estimation of administrative barriers to renewable energy deployment in the EU, excluding grid barriers

AT	BE	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	SK	SI	ES	SE	UK
😐	😐	-	☹	☺	-	☺	☹	☺	☹	☹	☺	☹	☹	☹	-	-	😐	😐	☹	-	☹	😐	☺	☺

Member States have to report again – new Member States for the first time – on the existing administrative barriers by October 2005.

Annex 7 – Guarantees of origin

Article 5 of Directive 2011/77/EC requires Member States to implement a guarantee of origin system (hereafter GO system) by 27 October 2003 for EU-15. For the 10 new Member States, the deadline for implementing such a system was, in accordance with the Treaty of Accession of 2003, 1 May 2004. The main objectives of such a system are to facilitate trade in electricity from renewable energy sources and to increase consumer transparency by distinguishing between electricity from renewable and non-renewable energy sources. This Annex contains an overview of the different stages reached with of GO systems in Europe.

The main stages in the implementation of a GO system are:

- implementing legislation,
- appointing an issuing body,
- setting up an accurate and reliable operational system for issuing guarantee of origins.

In accordance with Article 5 of the Directive, a guarantee of origin is issued on request. It is not an obligation for renewable electricity sources.

Based on national reports and supplementary information, the situation in September 2005 was as follows:

	Legislation	**Issuing body**	**Ready to GO**
EU-15			
Austria	Passed	DSO	Operational
Belgium	Passed	Regulator	Operational
Denmark	Passed	TSO	Operational
Finland	Passed	TSO	Operational
France	In process	TSO	In process
Germany	Passed	Auditors	Operational
Greece	In process	TSO	In process
Ireland	Passed	Regulator	In process
Italy	Passed	TSO	Operational
Luxembourg	Passed	Regulator	In process
Netherlands	Passed	TSO	Operational
Portugal	In process	TSO	In process
Spain	In process	Regulator	In process
Sweden	Passed	TSO	Operational
UK	Passed	Regulator	Operational

EU-10			
Cyprus	In process	Not appointed	In process
Czech Republic	Passed	Government organisation	In process
Estonia	Passed	Not appointed	Not started
Hungary	In process	Not appointed	Not started
Latvia	Not started	Not appointed	Not started
Lithuania	In process	TSO	In process
Malta	Passed	Regulator	In process
Poland	Passed	Regulator	In process
Slovenia	Passed	Regulator	In process
Slovakia	In process	Regulator	In process

In total only 9 of the 25 Member States have fully transposed this article into national legislation and put in place an operational system for issuing guarantees of origin. At present, none of the new Member States has an operational system issuing guarantees of origin.

Most of the EU-15 have passed legislation concerning a system of guarantees of origins, the exceptions being France, Greece and Portugal. However, these countries are in the process of adopting legislation. Of the new Member States, only the Czech Republic, Estonia, Malta, Poland and Slovakia have passed legislation regarding a system of guarantees of origin. The remaining new Member States, with the exception of Latvia, are in the process of preparing or have proposed legislation.

Altogether 21 countries have designated an issuing body. The majority of countries have appointed either a transmission system operator (TSO) (9 countries) or a regulator (8 countries) as the issuing body. The exceptions are Austria, Germany and Czech Republic, which have opted for a distribution system operator (DSO), a group of auditors and a governmental organisation, respectively. The tasks assigned to the issuing body also vary from country to country. In some countries, issuing bodies maintain a national register of guarantees of origin, while in others they are also responsible for accrediting the power generating plants. However, the task of plant accreditation and verification of eligibility is more often assigned to an institution other than the issuing body. All 9 countries with an operational system in place, with the exception of Germany, have established a national registry for keeping track of ownership of guarantees of origin and to facilitate redemption, if required. Only 3 countries, Austria, Belgium and the Netherlands have introduced redemption. Registry and redemption requirements help reduce the problems of multiple counting.

Other design features, also regarding applications for guarantees of origin, vary greatly from country to country. All countries with a fully operational system in place, with the exception of Italy and Germany, allow for the transferability of guarantees of origin. Italy requires transferability to be linked with the physical electricity, whereas Germany does not allow the transfer of guarantees of origin issued to production eligible for the German feed-in system. A few countries have introduced earmarking of guarantees of origin. In addition to Germany,

Austria, Denmark and the Netherlands require that the guarantee of origin is earmarked for support received or for tax benefits.

Under Article 5 of the directive, the Commission has to consider the desirability of proposing common rules for guarantees of origin. At present, the Commission does not see the need for proposing common rules. There are several reasons for this. Firstly, regarding the objective of facilitating trade, a necessary clarification was made in COM(2004) 366 on the role of the guarantee of origin and under what conditions a Member State can consider that imported renewable electricity can contribute to the achievement of the RES-E targets:

The Commission has decided to apply the following principle in assessing the extent to which national targets are met:

> *A Member State can only include a contribution from imports from another Member State if the exporting state has accepted explicitly, and stated on a guarantee of origin, that it will not use the specified amount of renewable electricity to meet its own target and has thereby also accepted that this electricity can be counted towards the importing Member State's target.*

This agreement should be included in a mutually recognised guarantee of origin. Currently, it seems there are no transfers of guarantees of origin between Member States in order to achieve targets.

Secondly, Directive 2003/54/EC[48] was adopted after Directive 2001/77/EC. Under Article 3(6) of Directive 2003/54/EC, Member States are required to implement a scheme for the disclosure of the fuel mix and selected environmental indicators on electricity sold to final consumers. The Commission regards this provision as an important measure in meeting the objective of consumer transparency as it covers the whole electricity sector, not only electricity from renewable energy sources. Several countries with legislation on the disclosure of generation details have already indicated that they will use the guarantee of origin to track information on renewable electricity generation. The guarantee of origin can therefore facilitate the implementation of electricity disclosure. The further development of disclosure would clearly increase consumer transparency.

Thirdly, a few countries have opted for a mandatory renewable energy quota obligation as the main support mechanism for renewable electricity. The quota obligation is administered by a system of tradable renewable energy certificates and there can be significant similarities between the guarantee of origin and tradable green certificates.

Nevertheless, the majority of Member States have chosen feed-in tariffs as the main instrument for promoting renewable electricity. Although there may be similar tasks required for the feed-in tariff system as for the issuance of a guarantee of origin, such as accreditation and verification procedures for renewable electricity production, the issuance of a guarantee of origin is not strictly necessary to facilitate feed-in tariff system.

The Commission considers that for the moment, the further development of disclosure would clearly increase consumer transparency.

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[48] Directive 2003/54/EC concerning common rules for the internal market in electricity and repealing Directive 96/92/EC.