

Sommario Rassegna Stampa

| Pagina | Testata | Data | Titolo | Pag. |
|--|------------------------|-------------|---|-------------|
| Rubrica Politecnico di Torino: stampa | | | | |
| 39 | la Stampa - ed. Torino | 24/03/2020 | <i>IL RAFFREDDAMENTO STUDIATO AL POLI NON CONSUMA ENERGIA (L.Di Paco)</i> | 2 |
| 15 | Torino Cronacaqui | 24/03/2020 | <i>IL NUOVO CONDIZIONATORE SOLARE DEL POLITECNICO ECCO ACQUA E SALE PER RINFRESCARE GLI</i> | 3 |
| Rubrica Politecnico di Torino: web | | | | |
| | Askaneews.it | 23/03/2020 | <i>RICERCA, TECNOLOGIA SOLARE A BASSO COSTO PER RINFRESCARE AMBIENTI</i> | 4 |
| | Askaneews.it | 23/03/2020 | <i>TECNOLOGIA, SFRUTTARE IL SOLE PER PRODURRE IL FREDDO</i> | 6 |
| | Innovationpost.it | 23/03/2020 | <i>UNA NUOVA TECNOLOGIA PER RINFRESCARE SFRUTTANDO LE DIFFERENZE DI SALINITA' E... L'ENERGIA SOLARE</i> | 9 |
| | I-talicom.it | 23/03/2020 | <i>IL SOLE PER PRODURRE IL FREDDO: NUOVA TECNOLOGIA SOLARE A BASSO COSTO DEL POLITECNICO DI TORINO</i> | 13 |
| | Macchinealimentari.it | 23/03/2020 | <i>NUOVA TECNOLOGIA SOLARE A BASSO COSTO DEL POLITECNICO DI TORINO PER IL RAFFRESCAMENTO AMBIENTALE</i> | 15 |
| | Vglobale.it | 23/03/2020 | <i>IL FREDDO DAL SOLE</i> | 18 |

IL PROGETTO

LEONARDO DI PACO

Il raffreddamento studiato al Poli non consuma energia

P. 48

LA RICERCA

**Raffrescare senza usare energia
L'idea del Poli**

Un dispositivo capace di raffrescare un ambiente senza l'utilizzo di energia elettrica attraverso una nuova tecnologia, che sfrutta l'evaporazione di un liquido. sportarla anche contro la forza di gravità. L.D.P.—

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Questa la proposta di un gruppo di studiosi del Politecnico di Torino (SMaLL) e dell'Istituto Nazionale di Ricerca Metrologica (IN-RiM) contenuta in una ricerca ripubblicata sulla rivista «Science Advances». La chiave è quella di usare semplice acqua e comune sale invece di composti chimici. L'impatto ambientale del nuovo dispositivo è inoltre ridotto perché basato su processi spontanei come la capillarità o l'evaporazione invece che su pompe e compressori che necessitano di energia e manutenzione.

La caratteristica peculiare del dispositivo ideato al Poli risiede nella sua progettazione: queste unità refrigeranti, spesse qualche centimetro, possono funzionare autonomamente oppure essere disposte in serie per aumentare l'effetto. In questo modo è possibile calibrarne la potenza in base alle esigenze. Inoltre, l'acqua non ha bisogno di pompe per essere movimentata ma si «sposta» spontaneamente grazie all'effetto capillare di alcuni componenti che, così come la carta da cucina, sono capaci di tra-



IL PROGETTO

Il nuovo condizionatore solare del Politecnico Ecco acqua e sale per rinfrescare gli ambienti

Il sole per produrre il freddo. Sembra un paradosso, eppure il Politecnico ha sviluppato una nuova tecnologia a basso costo in grado di rinfrescare gli ambienti in cui viviamo e lavoriamo tramite la radiazione solare. Evitando così il consumo di energia elettrica. Lo studio, condotto dal gruppo di studiosi "Small" dell'ateneo torinese, in collaborazione con l'Istituto Nazionale di Ricerca Metrologica (Inrim), sfrutta liquidi per il raffreddamento come i tradizionali condizionatori, ma invece dei composti chimici potenzialmente dannosi per l'ambiente, prevede il semplice utilizzo di acqua e

sale. «L'impatto ambientale del nuovo dispositivo è inoltre ridotto perché basato su fenomeni passivi, ossia processi spontanei come la capillarità o l'evaporazione, invece che su pompe e compressori che necessitano di energia e manutenzione» spiega Matteo Alberghini, dottorando del dipartimento Energia del Politecnico e primo autore della ricerca. La tecnologia non è ancora in commercio, tuttavia potrebbe presto affiancare gli impianti già esistenti riducendo il consumo energetico durante l'estate.

[r.l.e.]





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TG Web Lombardia

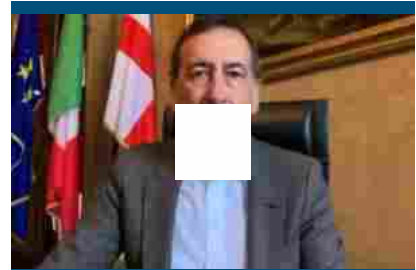


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macchine registrate da Cina e
Germania**



**Comasiana, arriva la sua per
evitare le code al superamento**

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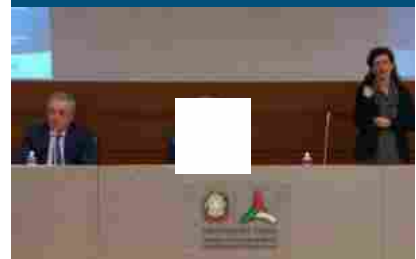
Comunicato. Sbir: similia per similia con qualità ricoverati



Comunicato. arrivo in Italia i nuovi e gli specialisti di Fatin



Comunicato. In Lombardia sono arrivati medici da Cuba



Comunicato. Lombardi: dove abbiamo una 20 mila persone






Consiglio Regionale
TG Web Lombardia



Il Coronavirus sfida il commercio, tutti nei punti per il lavoro

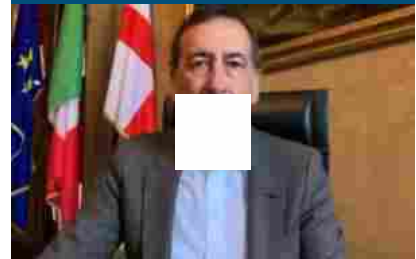


**Commercio. Assicurazioni
tutte sospese da Cina e Germania**

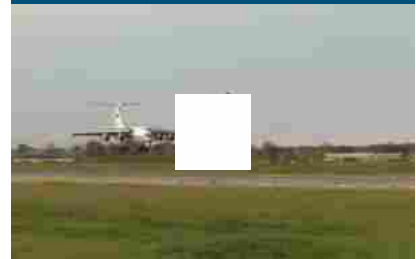
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**Comerchia. arriva la sua car
evitare le code al supermercato**



**Comerchia. Sale: similia per
bambini con qualità ricoverati**



**Comerchia. sono in Italia i
nani e gli specialisti di Putin**



**Comerchia. in Lombardia sono
arrivati medici da Cuba**





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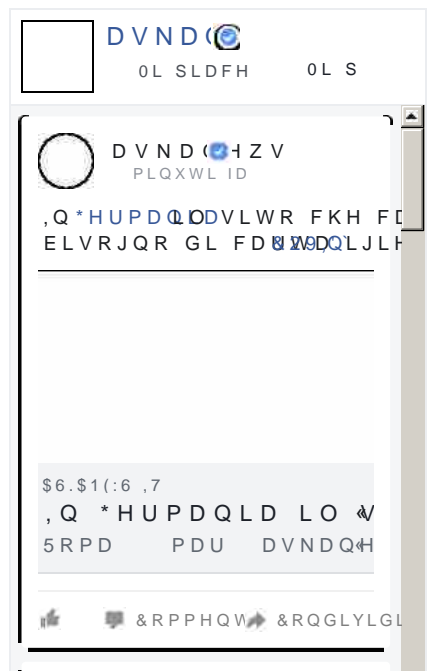


Coronavirus, Asiento sul web:



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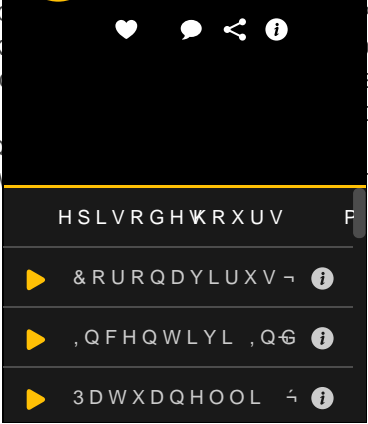
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miSKQ> !>ooKa]FKIQRS_S- laooal>_la IK] Si>loS^K_oa _KIQS> IK] , 2 1! "\$1 < K il\$ ISGKIG>2

> G>I>ooKISmoSG> uS_GK_oK IK] ISmiamSoSua SIK>oa >] ,a]SoKG_SGa O>]i>]ap]SmS_Kal kpKmoK p_SoB IKPISQKI>_oS- miKmmK kp>]GRK GK_oS^Kola GS>mGp_- iamma_a Pp_{S aiipIK KmmKIK ISmiamoK S_ mKISK- Ga^K >GG>IK Ga_]K Ga^p_S F>ooKISK- auS]A] (- L]K i K i]] IS l>PPIKMG>^K_oa^2 _ kpKmoa ^ala O iammsSFS]K G>]SFl>l_K]> iaok]](- SGpm^a K p. l>QQSp_QK_la G>i>GSoB IS l>PPIKMG>^K_oa Ga_Pla_o>FS]S > kpK]]K oSiSG>^K_oK la^KmoSGS^2 _a]o]K-]Î>Gkp> _a_ R> FSmaQ_a IS ia^iK iKl KmmKIK ^auS^K_o>o> a]]iS Pa]S IS ^> mS Èmiamo>i S_ ^ala mia_o>_Ka Ql>{SK >]]ÎKPPKooa G>iS]]>IK IS >]Gp_ooK_oS GR l> GpGS_- ma_a G>i>GS IS >mma]FSIK K ol>mialo>IK]Î>Gkp> >_GRK Ga_ola_]> Pal{> IS Ql>u: È _GRK >]o]K mol>oKQSK iKl S] l>PPIKMG>^K_oa i>mmSua ma_a S_ P>mK_ImS_mEK]_IS_îKSp]a] ISGKIG> ^a_IS>]S- >l KmK^iSa kpK]]K F>m>oK mp]]> ISmiKlmsa_m^iS]Ra>]a]K iK l>PPIKMG>^K_oa l>IS>oSua- mKiip] ila^KooK_oK K >l>ooa >l >]Gp_K >ii]SG>{Sa_S_ ilKmk_o:]S^SoS^ S] i]S_GSiSa mp GpS ms F>m> O S_KPPSG>GK S_ G]S^S olaiSQ^K]IK]SoSKa]K> kp>_la iKl>]ola S] FSmaQ_a IS Ga_IS{Sa_>^K_oa m>IKFFK ^>QQSa]K_ S_a]o]K S]]S^SoK o]Kals l>PPIKMG>^K_oa GRK ipe Pal_SIK O iSpooamoa ISlaooa^2] _amola .ilaooa.Sia-.i>mmS l>PPIKMG>^K_oa Ku>ial>oSua ol> IpK ma]p{Sa_S >GkpamK > ISuKlmsa_]S_Soa_u i]K]IK]K]IS m: IK>]S{{>_la p_ KPPKooa poS]K S_ ISiK_IK_oK l>]]p^SiSoB KmoKI_>2 ,Kl IS]St- laolK^a ac p_> G>i>GSoB IS l>PPIKMG>^K_oa >_GRK iSt K]Ku>o> >p^K_o>_la]> Ga_GK_ol>{Sa_K IK]]> aiipIK ISGalIK_la>l p_ IKmSQ_ ^alp]>IK iSt miS_oa IK] ISmiamSoSua]- Ga^K_o>_a S ISGKIG>o] iaok_{S>]K F>mma Gamoa IS ilalp{Sa_K Å >iiK_> kp>]GRK Kpla iKl GS>mGp_a mo>IS IK]]Î>mmK^F]>QQSa IK_IKIKFFK]a S] ISmiamSoSua SIK>]K iKl KmmKIK S_mo>]]>oa S_ {a_ ilKmk_{> IS oKG_SGS miKGS>]S{{>oS ipe IK_IKIK ISPPSGa]oam>]ÎS_mo>]]>{Sa_K K]> ^ ol>IS{Sa_>]S^2 _oKIKmm>_oS ISG>IpoK iaolKFFK]a >_GRK >uKlms S_ IKQSa_S Ga_GK_ol>{Sa_K m>]S_- Ga^K >l KmK^iSa kpK]]K GamoSkiK- _K]]K uSGS_-_{K IS Q]ammS S aiipIK S_ ilammS^SoB IS m>]S_K^2 l a]l>-]> oKG_a]aQS> _a_ O >_Gal> ila_o> iKl p_> S^^KIS>o> Ga^^KIGS>]S{{>{Sa_K^2 1p(muS]piiS Å>_GRK maQQKooS > Ppop]S iammsSFS]S PS_-_{S>^K_oS a Ga]]>Fal>{Sa_S S_ ilamiKooSu>- o>]K oKG_a]aQS> iaolKFFK >PPS>_G>IK Q]S S^iS>_oS QSB KmSmoK_oS >]]]>uala K- GamY IS]p]IK S] Ga_mp^a K_KIQKoSga > i>ISoB IS KPPKooa l>PPIKMG>_oK^2

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MP VEJJVIWGEQIRXS **E 7IKYMG M WY** R XEP

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VEJJVIWGEVI KPM EQFMIRXM WIR^E
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YLYLDP R ODYRULDPR q XQ¶HVLJHQJD
FRPXQH QHOOD PDJJLRU SDUWH GHOOH DUHH
DELWDWH ,Q (XURSD O¶HQHUJLD FRQVXPDW
SHU OD FOLPDWL]D]LRQH q JLj LQ
DXPHQWR PD O¶LQQDO]DPHQWR GHOOH
WHPHUDWXUH LQ GLYHUVH UHJLRQL GHO PRQGR
ID SUHYHGHUH XQ SRVLELOH DJJUDYDUVL GL TXHVWD HVLJHQJ

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3HU VRGGLVIDUH LO ELVRJQR GL UDIUHVFDPHQWR GHJOL HGLLFL GXUDQWH OD VWDJLRQH
WHFQRORJLD SL• GLIIXVD D OLYHOOR **FDPH WAFERB LH LRQDWR WWH DQKHMLQ** JOIVKIRAE SZMH PI E^MIT
VSHVVR LPSLHJD IOXLGL UHIULJHUDQWL DG DOWR LPSDWWR DP **WLRQV DQHVHWU SRKLEFHP MQR** MLEPMLERI GSRXMRYSERS E ;
HOHYDWR IDEELVRJQR GL HOHWWULFLWj &RPH ULGXUUH TXLQGL **DPCTQ** LPSDWWR HQHUJHWLF
UDIIUHVFDPHQWR GHJOL HGLLFL"

8QD SURSRVWD DUULYD GD XQ **JUXSSR GL VWXGDV L GH** 3RC **OIKKM PE** GL 7RULQR

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GHOOT,VWLWXWR 1DJLRQDOH GL 155DFHFKDKDHWXKORRWDXQ GLVSRVLWLYR
FDSDFH GL JHQHUDUH XQ HIIHWWR GL UDIIUHVFDPHQWR VHQJD OXWLOLJ]R GL HGHUJLD H
RJJHWWR GL XQD ULFHUFDSXEFQHFDM\$GXOODPHLOHVLGLVSRVLWLYL
WUDGLJLRQDOL DQFKH TXHVWD QXRYD WHFQRORJLD GLPLQXLVFD OD WHPSHUDWXUD GL XC
VIUXWWDQGR OTHYDSRUDJLRQH GL XQ OLTXLGR

7XWWDYLD OD FKLDYH GHOOD QXRYD VROXJLRQH SURSRVWD GDL ULFHUFDWRL WRULQHVL
XVDUH VHPSOLFH DFTXD H FRPXQH VDOH LQYHFH GL FRPSRVWL FKLPLFL SRWHQJLDOPHQW
GDQQRVL SHU ODPQLHQWH /LPSDWWR DPQLHQWDOH GHO QXRYR GLVSRVLWLYR q LQROW
SHUFKp EDVDWR VSDVQRPVQLD SURFHVVVLSRQWDQHL FRPH OD FDSLOODULWj R
OTHYDSRUDJLRQH FKH VX SRPSH H FRPSUHVVRL FKH QHFHVVLWDQR GL HGHUJLD H
PDQXWHQJLRQH

3)DU HYDSRUDUH DFTXD SHU RWWHQHUH XQD VHQVDJLRQH GL IUHVFR q XQD VROXJLRQH Q
PLOOHQQL FRPH LO VXGRUH FKH HYDSRUD VXOOD SHOOH SHU UDIIUHVFDFL R XQ IDJ]RC
LPEHYXWR DSSRJJLDWR VXOOD IURQWH QHOH JLRUQDWH SL• FDOGH /D QRVWUD LGHD S
LQJHJHULJ]DUH TXHVWD WHFQRORJLD PDVVLPLJ]DQGRQH O -XEPMER *SSH 8IGL PE VJ SF
TXDOVLDVL FRQGLJLRQH DPQLHQWDOH

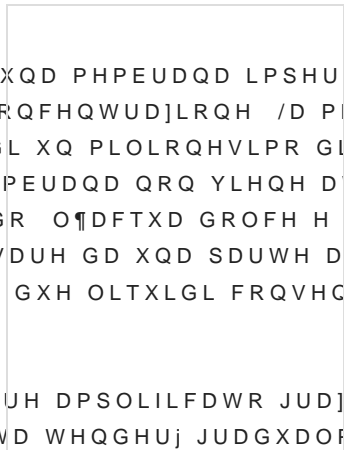
\$QJLFKp HVVHUH HVSRVWD DOOTDULD ODFDFTXD SXUD EDJQD XQD PHPEUDQD LPSHUPHDEL
OD VHSUDUD GD XQD VROXJLRQH GL DFTXD H VDOH DG DOWD FRQFHQWUDJLRQH /D PHPEUD
HVVHUH LPPDJLQDWD FRPH XQ VHWDFFLR FRQ PDJOLH JUDQGL XQ PLOLRQHVLPR GL PHWL
JUDJLH DOOH VXH SURSULHWj LGURUHSHOOHQWL TXHVWD PHPEUDQD QRQ YLHQH DWWUD`
GDOOTDFTXD OLTXLGD PD VROR GDO YDSRUH ,Q TXHVWR PRGR ODFDFTXD GROFH H VDODV
PHVFRODQR PHQWUH LO YDSRUH GDFDFTXD q OLEHUR GL SDVVDUH GD XQD SDUWH DOOTDC
PHPEUDQD ,Q SDUWLFRODUH OD GLIIHUHQWH VDOLQLWj QHL GXH OLTXLGL FRQVHQWH DC
GL HYDSRUDUH SL• YHORFHPHQWH GL TXHOOD VDODWD

4XHVWR PHFFDQLVPR UDIIUHGGD ODFDFTXD SXUD H SXz HVVHUH DPSOLILFDWR JUDJLH DO
SUHVHQJD GL GLYHUVL VWDGL HYDSRUDWLYL /DFDFTXD VDODWD WHQGHUJ JUDGXDOPHQWH
3UDGGROFLUVL` QHO WHPSR H GXQTXH OTHIIHWWR UDIIUHVFDFLWH DG DWWHQXDUX S FWXV
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(QHUJLD GHO 3ROLWHFQLFR H SULPR DXWRUH GHOOD ULFHUFD

/D FDUDWWHULVWLFDF YLQFHQWH GHO GLVSRVLWLYR LGHDWR DO 3ROLWHFQLFR GL 7RULQR
SURJHWDJLRQH TXHVWH XQLWj UHIULJHUDQWL VSHVVH TXDOWH \$FDFWVQRQRTDFQYWK
SRVVRQR IXQJLRQDUH DXWRQRPDPHQWH RSSXUH HVVHUH GLVSRVWH LO VWHUL FRPH DF
FRQ OH FRPXQL EDWWHULH LPSLODQGRH SHU DXPHQWUDH OTHIIHWWR GL UDIIUHVFDPHQ

,Q TXHVWR PRGR q SRVLELOH FDOLEUDUQH OD SRWHQJD LQ EBTGUDGONK VQBRQDKRQKQ
UDJLXQJHQGR FDSDFLWj GL UDIIUHVFDPHQWR FRQIURQWDELO RCFMCKP C VYKXQ UWNNGS
SHU JOL XVL GRPHVWLF ,QROWH ODFDFTXD QRQ KD ELVRJQR GL SRPSH SHU HVVHUH
PRYLPHQDWD DOOTLQWHUQR GHO GLVSRVLWLYR PD VL 3VSRVWD` LO PRGR VSRQWDOHR
DOOTTHIIHWWR FDSLOODUH GL DOFXQL FRPSRQHQL FKH FRVUHQVH QRPDUFN CDFKPHWQD
GL DVVRUELUH H WUDVSRUWUDH ODFDFTXD DQFKH FRQWUR OD RYJNCGLWJNY FGN RCPG

3\$QFKH DOWUH VWUDWHJLH SHU LO UDIIUHVFDPHQWR SDVVLV VRQR LQ IDVH GL VSHULP
LQ GLYHUVL FHQWUL GL ULFHUFDPQGLDOL DG HVHPSLR TXHOH EDVDWH VXOOD GLVSH
FDORUH SHU HIIHW,ORUDDIGLHWDFRQWR UDGLDWLYR VHSSXU ENRQIPVTHQWHQDFONKWR
DG DOFXQH DSSOLFJLRQL SUHVHQWD SHUZ GXH JURVVL OLPLWL LO SULQFLSLR VX FXL \



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GL UDIIUHVFDPHQWR FKH SXz IRUQLUH q SLXWWRVWR ULGRWWR

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,O QRVWUR SURWRWLSR SDVVLYR EDVDWR LQYHFH VXO UDIIUHVFDPHQWR HYDSRUDWLYR
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HIIHWWR XWLOH LQGLSHQGHQWH GDOOIXPLGLWj HVWHUQD 8IGRSP L SRWUHPPR RWWH
IXWXUR XQD FDSDFLWj GL UDIIUHVFDPHQWR DQFKH SL• HOHYDWD DXPHQWDQGR OD
FRQFHQWUDJLRQH GHOOD VROXJLRQH VDOLQD RSSXUH ULFRUUHQGR DG XQ GHVLJQ PRGXO
VSLQWR GHO GLVSRFHQWUDQR L ULFHUFDWRUL

,O SRWHQJLDOH EDVVR FRVWR GL SURGXJLRQH ± DSSHQD TXDOFKH HXUR SHU FLDVFXQR V
H OD VHPSOLFLWj GHOODVHPEODJJLR UHQGHUHEEHUR LO GLVSRVLWLYR LGHDOH SHU HV'
LQ JQRH UXUDOL GRYH OD VFUDVD SUHVHQjD GL WHFQLFL VSHFLDOLjDWL SXz UHQGHUH C
OQLQVWDOODJLRQH H OD PDQXWHQJLRQH GHL VLVWHPL WUDGLJLRQDOL ,QWHUHVDQWL UL
SRWUHEEHUR DQFKH DYHUVL LQ UHJLRQL ULFFKH GL DFTXH DG DOWD FRQFHQWUDJLRQH V
DG HVHPSLR TXHOOH FRVWLHUH QHOOH YLFLQDQjH GL JURVVL LPSLDQWL GL GLVVDODJLRQ
SURVVLPWj GL VDOLQH

\$G RUD OD WHFQRORJLD QRQ q DQFRUD SURQWD SHU XQD LPPHGLDWD FRPPHUFLDOLjDjDj
7XWWDYLD XOWHULRUL VYLOXSSL DQFKH VRJJHWWL D IXWXUL SRVVLELOL ILQDQJLDPHQWL
FROODERUDJLRQL LQG XVULDOL VRQR SRVVLELOL ,Q SURVSHWWLYD WDOH WHFQRORJLD
DIILDQFDUH JOL LPSLDQWL JLj HVLVWHQWL DOOHJJHUHQGR LO ORUR FDULFR GL ODYRUR H
FRQVXPR HQUJHWHLFR D SDULWj GL HIIHWWR UDIIUHVFDPHQWH

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'SQTSWXM FMSEXXMZM HM SVMKMRI QMGVSEPKEPI
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FROODERUDJLRQH FRQ O ¶ , VWLWXWR QDJLRQDOH GL ULFHUFDPHWURORJLFD , QULP H
SXEEOLFDPWR VXOOD ULYLVWD © 6FLHQFH \$GYDQFHV^a SURSRQH XQD WHFQRORJLD SHU
UDIIUHVFDPHQWR DPELHQWL VHQJD O ¶ XWLOLJJR GL HQHUJLD HOHWWULFD PD VIUXWWDQGR
GLUHWWDPHQWH OD UDGLDJLRQH VRODUH

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QHOOD PDJJLRU SDUWH GHOOH DUHH DELWDWH ,Q (XURSD O¶HQHUJLD FRQVXPDW SHU O FOLPDWL]]D]LRQH q JLj LQ DXPHQWR PD O¶LQQDO]DPHQWR GHOOH WHPSHUDWXUH LQ GLY UHJLRQL GHO PRQGR ID SUHYHGHH XQ SRVLELOH DJJUDYDUVL GL TXHVWD HVLJHQ]D 3HI VRGGLVIDUH LO ELVRJQR GL UDIIUHVFDPHQWR GHJOL HGLILFL "C 5QEKGV• FGN D VVWU• H• POH HVV WHFQRORJLD SL• GLIIXVD D OLYHOOR GRPHVWLFH H LQGXXVWU•L•D•D•H•S•L•E•P•Z•W•S•M•R•E•Q•R•X•S•] VSHVVR LPSLHJD IOXLGL UHIULJHUDQWL DG DOWR LPSDWWR DPQLHQWDOH H O¶LPSDWWR HOHYDWR IDEELVRJQR GL HOHWWULFLWj &RPH ULGXUHH TXLQGL O¶LPSDWWR HQHUJHWLF UDIIUHVFDPHQWR GHJOL HGLILFL"

8QD SURSRVWD DUULYD GD XQ J U X S S R GL V W X G P R V L G H O 3 R O L W H F Q L F R GL 7 R U L Q R G H O O ¶ , V W L W X W R 1 D] L R Q D O H G L 1 5 5 D F H K F D K O H W W X R O R D W R D X Q G L V S R V L W L Y R \$ V V W C \$ V V W C F D S D F H GL J H Q H U D U H X Q H I I H W W R GL U D I I U H V F D P H Q W R V H Q] W I O Z S R S L O S P Y R M G I N F S H S J U D H R J J H W W R GL X Q D U L F H U F D S X E E O L F D W D \$ X O O D F U L Y L V W D © S Z M H I W S J M W O T E Z U Y E á T V I W M W T E V Q M E V F

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&RPH QHL GLVSRVLWLYL WUDGL]LRQDOL DQFKH TXHVWD QXRYD WHFQRORJLD GLPLQXLVFH WHPSHUDWXUD GL XQ DPQLHQWH VIUXWWDQGR O¶HYDSRUD]LRQH GL XQ OLTXLGR 7XWWDYL GHOOD QXRYD VROX]LRQH SURSRVWD GDL ULFHUFDWRUL WRULQHVL q TXHOOD GL XVDUH V H FRPXQH VDOH LQYHFH GL FRPSRVWL FKLPLFL SRWHQ]LDOPHQWH GDQQRVL SHU O¶DPQLH /¶LPSDWWR DPQLHQWDOH GHO QXRYR GLVSRVLWLYR q LQROWUH ULGRWWR SHUFKp EDVDW IHQRPHQL SDVVLYL RVVLD SURFHVVV VSRQWDQHL FRPH OD FDSLOODULWj R O¶HYDSRUD]L FKH VX SRPSH H FRPSUHVVURUL FKH QHFHVVLWDQR GL HQHUJLD H PDQXWHQ]LRQH

©)DU HYDSRUDUH DFTXD SHU RWWHQHUH XQD VHQVD]LRQH GL IUHVFR q XQD VROX]LRQH (PLOOHQQL FRPH LO VXGRUH FKH HYDSRUD VXOOD SHOOH SHU UDIIUHVFDFUL R XQ ID]]ROF LPEHYXWR DSSRJJLDWR VXOOD IURQWH QHOOH JLRUQDWH SL• FDOGH /D QRWUD LGHD SH LQJHQHUL]]DUH TXHVWD WHFQRORJLD PDVVLP]]DQGRQH O¶HIIHWWR H UHQGHQGRD SR TXDOVLDVL FRQGL]LRQH DPQLHQWDOH \$Q]LFKp HVVHUH HVSRVWD DOO¶DULD O¶DFTXD SXI XQD PHPEUDQD LPSHUPHDELOH FKH OD VHSUD GD XQD VROX]LRQH GL DFTXD H VDOH DG E FRQFHQWUD]LRQH /D PHPEUDQD SXz HVVHUH LPPDJLQDWD FRPH XQ VHWDFFLR FRQ PDJC JUDQGL XQ PLOLRQHVLPR GL PHWUR JUD]LH DOOH VXH SURSULHWj LGURHSHOOHQWL TXH PHPEUDQD QRQ YLHQH DWWUDYHUVDWD GDOO¶DFTXD OLTXLGD PD VROR GDO YDSRUH ,Q T PRGR O¶DFTXD GROFH H VDODWD QRQ VL PHVFRODQR PHQWUH LO YDSRUH G¶DFTXD q OL SDVVDUH GD XQD SDUWH DOO¶DOWUD GHOOD PHPEUDQD ,Q SDUWLFRODUH OD GLIHHUHQWH GXH OLTXLGL FRQVHQWH DOO¶DFTXD SXUD GL HYDSRUDUH SL• YHORFHPHQWH GL TXHOOD V 4XHVWR PHFFDQLVPR UDIIUHGGD O¶DFTXD SXUD H SXz HVVHUH DPSOLILFDWR JUD]LH DOO SUHVHQ]D GL GLYHUVL VWDGL HYDSRUDWLYL /¶DFTXD VDODWD WHQGHHJ JUDGXDOPHQWH ³UDGGROFLUVL´ QHO WHPSR H GXQTXH O¶HIIHWWR UDIIUHVFDPHQWH DG DWWHQXDUVL WXWV GLIHHUHQ]D GL VDOLQLWj WUD OH GXH VROX]LRQL SXz HVVHUH FRQLQXDOPHQWH H LQ PR VRVWHQLELOH ULVWDELOLWD WUDPLWH O¶HQHUJLD QRRVODURH FRPH SHUDOWUR GLPRVWUD UHFHQWH V W X S L R H J D O D W W H R \$ O E H U J K L Q L G R W W R U D Q G R G H O ' L S D U W L P H Q W R (Q H U J L D G 3 R O L W H F Q L F R H S U L P R D X W R U H G H O O D U L F H U F D

/D FDUDWWHULVWLF D YLQFHQWH GHO GLVSRVLWLYR LGHDWR DO 3ROLWHFQLFR GL 7RULQR SURJHWWD]LRQH TXHVWH XQLWj UHIULJHUDQWL VSHVVH TXDOFKH FHQWLPHWUR FLDVFXC SRVVRQR IXQ]LRQDUH DXWRQRPDOPHQWH RSSXUH HVVHUH GLVSRVWH LQ VHULH FRPH DF FRQ OH FRPXQL EDWWHULH LPSLODQGRH SHU DXPHQWUDUH O¶HIIHWWR GL UDIIUHVFDPHQ TXHVWR PRGR q SRVLELOH FDOLEUDUQH OD SRWHQ]D LQ EDVH DOOH VLQJROH HVLJHQ]H UDJJLXQJHQGR FDSDFWj GL UDIIUHVFDPHQWR FRQIURQWDELOL D TXHOOH WLSLFDOPHQWH (SHU JOL XVL GRPHVWLF

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,QROWUH O¶DFTXD QRQ KD ELVRJQR GL SRPSH SHU HVVHUH PRYLPHQWDWD DOO¶LQWHUQI
GLVSRVLWLYR PD VL @VSRVWDª LQ PRGR VSRQWDQHR JUD]LH DOO¶HIIHWWR FDSLOODUH C
FRPSRQHQWL FKH FRVU FRPH OD FDUWD GD FXFLQD VRQR FDSDFL GL DVVRUELUH H WUD
O¶DFTXD DQFKH FRQWUR OD IRU]D GL JUDYLWj

@\$QFKH DOWUH VWUDWHJLH SHU LO UDIIUHVFDPHQWR SDVVLYR VRQR LQ IDVH GL VSHULPH
GLYHUVL FHQWUL GL ULFHUFD PRQGLDOL DG HVHPSLR TXHOOH EDVDWH VXOOD GLVSHUVLR
SHU HIIHWWR UDGLDWLYR ,O UDIIUHVFDPHQWR UDGLDWLYR VHSSXU SURPHWWHQWH H D
DOFXQH DSSOLFD]LRQL SUHVHQWD SHUZ GXH JURVVL OLPLWL LO SULQFLSLR VX FXL VL ED
LQHILFDLH LQ FOLPL WURSLFDOL H LQ JHQHUDOH QHOOH JLRUQDWH PROWR XPLGH TXDQGI
ELVRJQR GL FRQGL]LRQDPHQWR VDUHEEH PDJJLRUH LQROWUH LO OLPLWH WHRULFR GHOC
UDIIUHVFDPHQWR FKH SXz IRUQLUH q SLXWWRVWR ULGRWWR ,O QRWUR SURWRWLSR SI
LQYHFH VXO UDIIUHVFDPHQWR HYDSRUDWLYR WUD GXH VROX]LRQL DFTXRVH D GLYHUVH V
SRWUHEEH VXSHUDUH TXHVWR OLPLWH UHDOL]DQGR XQ HIIHWWR XWLOH LQGLSHQGHQWH
HVWHUQD 3HU GL SL• SRWUHPR RWWHQHUH LQ IXWXUR XQD FDSDFLWj GL UDIIUHVFDPH
DQFKH SL• HOHYDWD DXPHQWDQGR OD FRQFHQWUD]LRQH GHOD VROX]LRQH VDOLQD RSS
ULFRUHQGR DG XQ GHVLJQ PRGXODUH SL• VSLQWR GHO GLVSRVLWLYRª FRPPHQWQR L
ULFHUFDWRUL

-R GEQTEKRE I E QEVI

,O SRWHQ]LDOH EDVVR FRVWR GL SURGX]LRQH DSSHQD TXDOFKH HXUR SHU FLDVFXQR VM
VHPSOLFLWj GHOO¶DVVHPEODJJLR UHQGHUHEEHUR LO GLVSRVLWLYR LGHDOH SHU HVVHUH
]RQH UXUDOL GRYH OD VFDUVD SUHVHQ]D GL WHFQLFL VSHFLDOL]DWL SXz UHQGHUH GLII
O¶LQVWDOOD]LRQH H OD PDQXWHQ]LRQH GHL VLVWHPL WUDGL]LRQDOL ,QWHUHVVDQWL UL
SRWUHEEHUR DQFKH DYHUVL LQ UHJLRQL ULFFKH GL DFTXH DG DOWD FRQFHQWUD]LRQH V
DG HVHPSLR TXHOOH FRVWLHUH QHOOH YLFLQDQH GL JURVVL LPSLDQWL GL GLVVDOD]LRQ
SURVVLPPLWj GL VDOLQH

\$G RUD OD WHFQRORJLD QRQ q DQFRUD SURQWD SHU XQD LPPHGLDWD FRPPHUFLDOL]D]D]
7XWWDYLD XOWHULRUL VYLOXSSL DQFKH VRJJHWWL D IXWXUL SRVVLELOL ILQDQ]LDPHQWL
FROODERUD]LRQL LQGXWULDOL VRQR SRVVLELOL ,Q SURVSHWWLYD WDOH WHFQRORJLD
DIILDQFDUH JOL LPSLDQWL JLj HVLVWHQWL DOOHJJHUHQGR LO ORUR FDULFR GL ODYRUR H
FRQVXPR HQHUJHWLFR D SDULWj GL HIIHWWR UDIIUHVFDPHQWH

> @ ODWWHR \$OEHUJKLQL ODWWHR ORUFLDQR ODWWHR)DVDQR)DELR %HUWLJOLD 9LWF
)HUQLFROD 3LHWUR \$VLQDUL (OLGRUR &KLDYD]JR OXOWLVDJH DQG SDVVLYH FRROLQ
GULYHQ E\ VDOLQLW6RLHJH6HFDQFHV

> @ (OLGRUR &KLDYD]JR ODWWHR ORUFLDQR)UDQFHVFD 9LJOLQR ODWWHR)DVDQR 3
\$VLQDUL 3DVVLYH VRODU KLJK \LHOG VHDZDWHU GHVDOLQDWLRQ E\ PRGXODU DQG ORZ FI
GLVWLOODWLQRQ ©XVWDLQDELOLW\

)RQWH 3ROLWHFQLFR GL 7RULQR

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