

Indian Institute of Technology  
Kharagpur  
Department of Chemical Engineering  
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Impacts and its impact on air



impacts and its impact on the environment

Introduction

o pr an as r at pa t on In an E ono Fr v ana s s w  
prov b tt r un rstan n o t o o pr on sto r turn vo at t r  
In a s an r n ar t an n t ast two a s b aus o s v ra  
ono r or s In a as attra t ots o or n r t nv st nt an attra t  
or n port o o nv stors or nv st nt n In a I pa t o o pr on sto  
r turn vo at t w p t b tt r un rstan n o t r s asso at wt t s  
r In t s stu w propos to t st t at w t r o pr as xp anator pow r

s tors on o Countr s w r sto n s ar not v r w v rs an a  
b w s tors ons st n o ar r s stu s bas on a r at sto ar t  
a not r v a t tru p tur o t asso at on b tw n o pr an sto  
ar t E as an ta Arour u n L ta xa n t  
pa t o o pr at s tor v an n t at o pr t s tora n s  
t ro n ous Stu s s ow t at pa t o o pr on anu a tur n an  
transport s n at v as t ost o pro u t on n r as s w t o pr r s w r as  
t pa t s pos t v or o an as s tor as t ar ab to pass t pr to t  
onsu rs an t b n t b aus o r nv ntor va u an a an Fa

ara an an S ar a sa xa n t t o o pr on sto  
ar t at r v s stu s n t at n at v t o o pr on sto  
r turn o nat s t pos t v t o o pr on sto r turn an a so p n

**a b** Descriptive Statistics  
Skewness Kurtosis  
Standard Deviation Skewness

a b s o w s t o r r a t o n b t w n t r o w t n o p r s a n s t o r r t u r n s  
o p r s a n s t o r r t u r n v o a t t

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S t o r S t o t u r n s t u r n o a t t

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Auto ob s Co pon nts  
Ban s  
Cap ta Goo s  
Co r a r o s s o n a  
S r v s  
Consu r Durab s Appar  
Consu r S r v s  
D v r s F n a n a s  
En r  
Foo Stap s ta n  
Foo B v r a o b a o  
H a t Car Equ p nt S r v s  
Hous o r s o n a r o u t s  
Insuran  
at r a s  
a Ent r t a n nt  
ar a ut a s B o t n o o  
a Estat  
ta n  
So twar S r v s  
no o Har war  
Equ p nt  
o un at on S r v s  
ransportat on  
t t s

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t stat st s ar v n n par nt s s

Corr at on b t w n o r t u r n s a n s t o r r t u r n s s u s t t a t o s t o t s t o r s  
ar p o s t v o r r a t b u t t a n t u o a s s o a t o n s n o t v r s t r o n

r s'

A on a or s tors w r t r ar or t an r 's ata sava ab w n  
t at Auto ob s an Co pon nts at r a s  
ar a ut a s an Bot no o Cap ta Goo s  
Consu r Durab s Appar an Ban s tors r port stron  
n at v asso at on b tw n r s' sto r turn vo at t w t o rowt A ost  
n a s tors nu b r o r s w os sto r turn vo at t s a t n at v  
w t r s no pr s ar r t an t r s or w sto r turn vo at t s  
a t post v w t r s no En r s tor s v r u a t b t  
an no pr s an n r as no pr s n r as xp t as ows or su  
r s Aroun r s n En r s tor s ows n at v r at ons p b tw n  
o rowt an sto r turn vo at t H t ro n ous t o o pr on r turn  
vo at t an w var s ro on s tor to anot r an b xp an w t t  
ara t r st s o t s tors As r s n so s tors r qu r or ap ta t an  
t r s not r s tors t r op rat n v ra nan a v ra a so var s

A on a or s tors w n t at Auto ob s an Co pon nts  
at r a s ar a ut a s an Bot no o Cap ta  
Goo s Consu r Durab s Appar Ban  
s tors r port stron post v asso at on b tw n r s' sto r turn vo at t w t  
o rowt su ts su st t at w n w xa n t asso at on b tw n o  
r turns an sto r turn vo at t at an a r at v t rou n x or s tora  
n s o s not v t tru p tur an t r or pr v ous stu s prov x  
v n Dr spron t a Jon s Kau ara an ara an  
Z u t A

Furt r as our r su ts su st t at t r s a t ro n ous r at ons p b tw n o  
pr s an r s' r turn vo at t w n to xa n t s r at ons p bas on t  
r s' ara t r st s an t n o n or at on ow ro o ar t to  
sto ar t  
o xa n t n o n or at on ow ro o pr s to sto ar t w  
a a o r turns n t GA CH var an quat on a o rowt  
a s up to or ro t su ts ar r port n ab us o ow n GA CH  
o to xa n o pr -r turn vo at t r

pr rr ov r t A a In or at on r t r on AIC as t pos r p na t  
 or a t on a var ab app GA CH o or a r s In so  
 as s t r ar ssu s o non nor a t n r turns o so t r s an t r w r  
 pr s n o at ta s an p a n ss an t r or w app GA CH o  
 G n ra Error D str but on GED so t at out r su ts wou r a n robust

su ts s ow t at t r s a stron r at ons p n a o r turns - r turn  
 vo at t o t r s n a s tors For t br vt o spa w ar s ow n  
 r su ts o on s tors ow v r r su ts a b obta n ro t aut or on  
 r qu st In so s tors su as Auto ob Co pon nts Cap ta Goo s  
 Consu r Durab s an Appar s D v rs F nan a s at r a s  
 ar a ut a s an Bot no o So twar an S rv s a o r turn -  
 r turn vo at t r at ons p s s n ant n or t an as s Ban s En r  
 Foo B v ra oba o a Ent rta n nt a Estat ransport an  
 t t s a o r turns w r s n ant n ss t an as s su ts s ows  
 t at t r s a un rr a t on n qu t ar t but t to on w s tors s  
 s ows t at so w at In an ar t s nt w n n or at on ro o ar t s  
 on rn

**a b** to a

La s	Auto ob s	Co pon nts	Ban s
S	us	S	nus

Cap ta Goo s	Consu r Durab s	Appar
S	us	S
S	nus	nus

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D v rs	F nan a s	En r
S us	S nus	S us      S nus

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Foo B v ra	oba o	at r a s
S us	S nus	S us      S nus

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La s	a Ent rta n nt	ar a ut a s B ot no o
S us	S nus	S us      S nus

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S us

o par to s a r r s s a b xp an u to t a t t at ar r r s  
ar o ow b t qut ana sts v r os as o par to s a r r s an  
t r or t o o on r vo at t r at

### Conc sions

xa n t t o o pr on r turn vo at t or r s st n In an  
ar t ro a p r o ro Jan to D us GA CH o to  
xa n t o pr - r turn vo at t r at ons p ur n n s su st t at t  
t o o pr on r turn vo at t o r s s t ro n ous n at v t o  
o pr on r turn vo at t o nat s pos t v t o o pr on r turn vo at t  
n ost o t s tors Auto ob Co pon nts Ban s Cap ta Goo s  
Consu r Durab an Appar D v rs F nan a s En r Foo B v ra  
oba o at r a s ar a ut a s Bot no o So twar an S rv s ar  
t a or s tors w r pos t v pa t o o pr s on r turn vo at t s oun n  
or t an as s Furt r w xa n t a o pr t on r turn  
vo at t to un r stan t un rr a t on o t qut ar t n t at on n

C n F o o s s S A E ono or s an t sto ar t  
Journa o bus n ss

C o K Ha ou S o at t b av or o o n ustr a o o t  
an sto ar ts n a r sw t n nv ron nt En r o -

Cr st n A n p o nt an pr ar o o t pr s t or an  
v n n a oba p rsp t v St art n s r ss

Dr spron G Ja obson B att B Str n o Anot r pu  
Journa o F nan a E ono s -

E as an E ansur I usa B pr s o s an n ustr sto  
r turns En r E ono s -

Fr an ob tur n at on an un p o nt Journa o  
o t a E ono

Ha ton J D an t a ro ono s n or ar II Journa o  
o t a E ono -

Ha ton J D at s an o s o Journa o E ono tr s -

Jon s C Kau G an t sto ar ts Journa o  
F nan

K an L ot a o pr s o s ar a D s ntan n an an  
supp s o s n t ru o ar t A r an E ono v w -

Ko as C K rtsou C apa a ou S ts o t rror s on t o  
pr sto n x r at ons p En r E ono s -

L H C an Y E t o o pr s o s on t sto ar t  
p r or an Do natur o s o s an ono s att r En r E ono s  
-

L B J Yan C Huan B pr ov nts an sto  
ar ts r v s t A as o s tor sto pr n x s n t G ountr s En r  
E ono s -

o A Ass a A S sto r turns an o pr s ta  
ro a ata an t - nan a r s s En r E ono s -

an a Fa Do s o ov qu t pr s A oba v w  
En r E ono s -

