Run title	-->	CFETR small (5.7m) reference file
PROCESS Version	-->	1.0.3
Date:	-->	02/12/2016
Time:	-->	14:33
User:	-->	morrisj
Optimising:	-->	toroidal field on axis

Plasma composition:

Number densities relative to electron density:

D + T	= 0.7547
He	= 0.07143
Be	= 0.02
Ar	= 0.001256

Geometry:

R_0	= 5.72 m
a	= 1.605 m
A	= 3.563
κ_{95}	= 1.607
δ_{95}	= 0.2667
Surface area	= 496.4 m^2
Plasma volume	= 475.7 m^3
No. of TF coils	= 16
inboard blanket+shield	= 0.732 m
ouboard blanket+shield	= 1.852 m
Fusion power	= 247.5 MW

Physics:

I_p	= 8.705 MA
Vacuum B_T at R_0	= 4.95 T
q_{95}	= 2.901
β_N, thermal	= 2.502 % m T MA^{-1}
β_N, total	= 2.95 % m T MA^{-1}
β_P, thermal	= 1.14
β_P, total	= 1.345
$<t_e>$	= 8.772 keV
$<n_e>$	= 9.841e+19 m^{-3}
$<n_{\rm e,line}>/n_G$	= 1
$T_{e0}/<T_e>$	= 1.5
$n_{e0}/<n_{\rm e,vol}>$	= 1.25
$Z_{\rm eff}$	= 1.763
$Z_{\rm eff,SoL}$	=ERROR! Var missing
$n_Z/<n_{\rm e,vol}>$	= 0.02126
τ_e	= 2.149 s
H-factor	= 1.3
Scaling law	= IPB98(y,2)

Coil currents etc:

PF 1	= 10.27 MA
PF 3	= -7.873 MA
Startup flux swing	= 120.4 Wb
Available flux swing	= -238 Wb
Burn time	= 0.2778 hrs

TF coil type is ITER Nb3Sn

Peak field at conductor (w. rip.)	= 11.18 T
I/I$_{\rm crit}$	= 0.623
Temperature margin	= 1.916 K
Conduit Von Mises stress	= 3.549e+08 Pa
Case Von Mises stress	= 4.228e+08 Pa
Allowable stress	= 7e+08 Pa

Costs

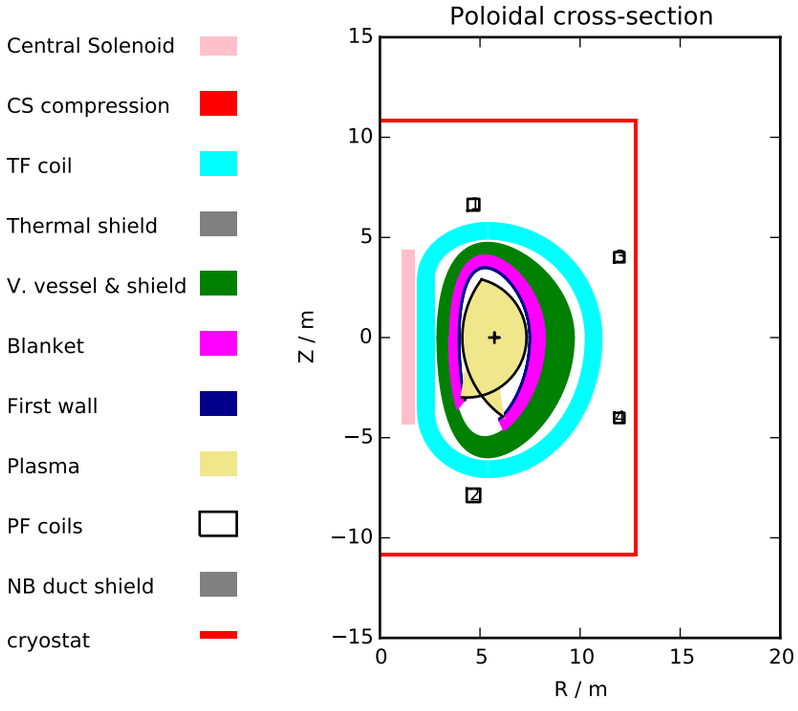
Cost of electricity	=ERROR! Var missing

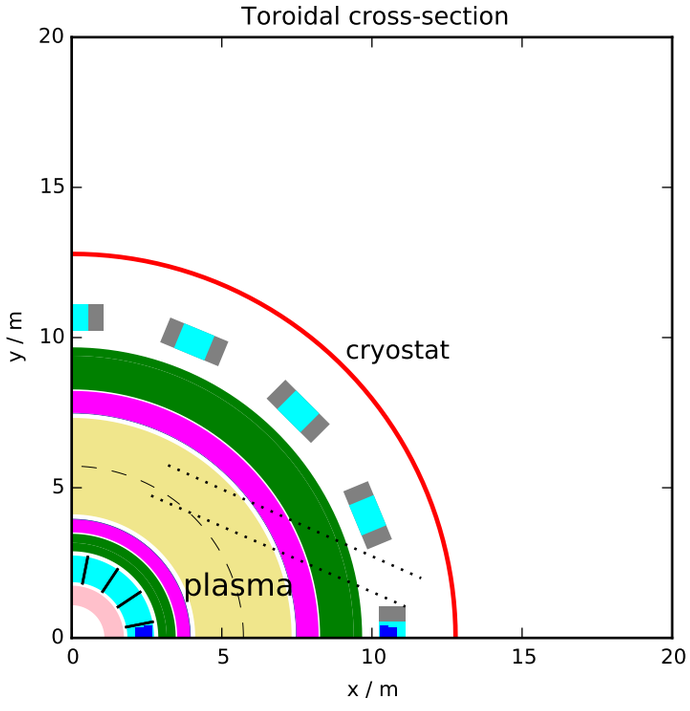
Power flows:

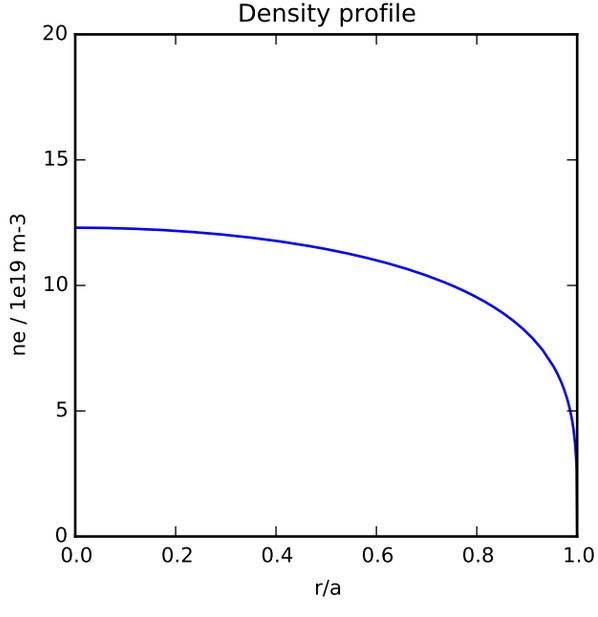
Nominal neutron wall load	= 0.3669 MW m^{-2}
Normalised radius of 'core' region	= 0.6
Electron density at pedestal	= 0 m^{-3}
r/a at density pedestal	= 1
Helium fraction	= 0.07143
Core radiation	= 12.42 MW
Total radiation	= 23.17 MW
Nuclear heating in blanket	= 208.4 MW
Nuclear heating in shield	= 0.218 MW
Power to divertor	= 80.16 MW
H-mode threshold	= 45.12 MW
Divertor life	= 2.348 years
Primary (high grade) heat	= 245.4 MW
Gross cycle efficiency	= 41.12 %
Net cycle efficiency	= 40.98 %
Gross electric power	= 100.9 MW
Net electric power	= -169.5 MW
Fusion-to-electric efficiency $\frac{P_{\rm e,net}}{P_{\rm fus}}$	= -68.48 %

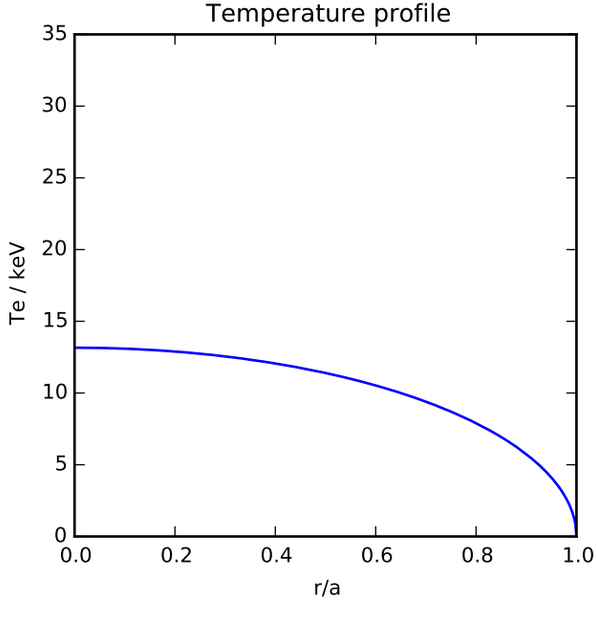
Neutral Beam Current Drive:

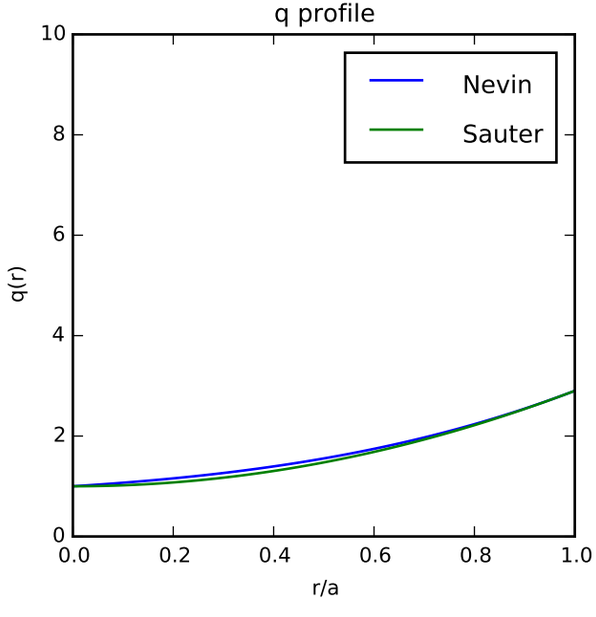
Steady state auxiliary power	= 55.95 MW
Power for heating only	= 0 MW
Bootstrap fraction	= 0.4292
Auxiliary fraction	= 0.324
Inductive fraction	= 0.2468
NB gamma	= 0.2835 10^{20} A W^{-1} m^{-2}
NB energy	= 802.8 keV
Plasma heating used for H factor	= 90.92 MW
$\frac{P_{\rm div}}{R_0}$	= 14.01 MW m^{-1}
$\frac{P_{\rm div}}{<n>R_0}$	= 14.24 $\times 10^{-20}$ MW m^2
$\frac{P_{\rm div}}{P_{\rm LH}}$	= 1.777
H* (non-rad. corr.)	= 1.242


Central Solenoid
CS compression
TF coil
Thermal shield
V. vessel & shield
Blanket
First wall
Plasma
PF coils
NB duct shield
cryostat
Poloidal cross-section
Z / m
R / m


Toroidal cross-section
cryostat
plasma
y / m
x / m


Density profile
ne / 1e19 m-3
r/a


Temperature profile
Te / keV
r/a


q profile
Nevin
Sauter
q(r)
r/a